THE CHILDREN'S ENCYCLOPEDIA

The Children's Encyclopedia

VOLUME ONE

Chief Contributors to
The Children's Encyclopedia

Literary	Art
T. THORNE BAKER	FREDERICK ANGER
HAROLD BEGBIE	HILDA M. COLEY
ERNEST A. BRYANT	A. FORESTIER
JOHN DERRY	F. R. HINKINS
ARTHUR D. INNES	J. R. MONSELL
MARGARET LILLIE	GEORGE F. MORRELL
CHARLES RAY	WAL PAGET
C. W. SALEEBY	S. B. PEARSE
J. A. SPENDER	T. H. ROBINSON
J. ARTHUR THOMSON	W. B. ROBINSON
R. F. TOWLER	CHARLES M. SHELDON
H. N. TYERMAN	E. F. SKINNER
H. C. WHAITE	S. E. TRANTER
PERCY M. YOUNG	S. J. TURNER

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THE CHILDREN'S ENCYCLOPEDIA

ORIGINATED
AND EDITED
by
ARTHUR MEE

VOLUME ONE

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SHAKESPEARE FANCIES A NEW RHYME

IN HIS COTTAGE DAYS AT STRATFORD WE MAY BE SURE THAT SHAKESPEARE, FANCYING SOME NEW RHYME, WOULD CALL ANNE HATHAWAY TO LISTEN AS HE PROUDLY READ IT OVER

To face Page iii of Volume One

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CONTENTS OF THIS VOLUME

GROUP 1 — EARTH AND ITS NEIGHBOURS

The Big Ball We Live On .. 9
How the Earth was Made .. 137
Three Ways the Earth Moves .. 265
Inside the Wonderful Ball .. 393
How Fire and Water Made the World .. 517
How Sun and Wind Made the Hills .. 641

GROUP 2 — MEN AND WOMEN

The First Flying Men .. 19
The Kings of Music .. 141
The Famous Men of Venice .. 271
Creators of Fantasy .. 399
Cromwell and His Men .. 521
The French Revolutionists .. 647

GROUP 3 — STORIES

Sections begin on pages 27, 151, 283, 407, 529, 655

GROUP 4 — ANIMAL LIFE

Nature's Thousands of Children .. 37
The Animals Most Like Men .. 159
Bats and Their Friends .. 291
Big Cats and Little Cats .. 417
The Wild Dogs .. 537
The Friendly Dogs .. 663

GROUP 5 — HISTORY

Man Sets Out on a Journey .. 45
Man Builds Himself a House .. 167
Man Feels His Way to Power .. 297
The Wondering Egyptian .. 425
Man Begins to Think of God .. 543
A New Birth for Mankind .. 671

GROUP 6 — FAMILIAR THINGS

Iron and Steel .. 49
Cotton 171
Rope 179
China .. 301
Airways .. 429
Bridges .. 547
The Piano .. 675

GROUP 7 — WONDER

Sections begin on pages 59, 183, 307, 439, 559, 679

GROUP 8 — ART

The Rich Treasure That is Ours .. 65
The Cave Men and their Pictures .. 191
The Artists of the Old Empires .. 315
A Great Light Shines .. 443
The Wonder Men of Florence .. 565
Leonardo and Michael Angelo .. 687

GROUP 9 — OURSELVES

Life that Fills the Earth .. 77
The First Living Things .. 199
Why Life Left the Sea .. 325
Life Makes the Body .. 451
The Tiniest Living Things .. 575
Our Unseen Friends and Foes .. 697

GROUP 10 — PLANT LIFE

How Life Goes Round and Round .. 81
A Plant's Struggle for Life .. 203
Birth, Life, and Death of a Flower .. 329
How Plants Work for their Living .. 457
How Plants Move and Feel .. 579
Plants and their Ancestors .. 701

GROUP 11 — COUNTRIES

This Great World of Ours .. 87
Our Homeland .. 209
Seeing Our Homeland From the Sea .. 337
Our Great and Little Hills .. 461
England in the Long Ago .. 587
The Conqueror Comes .. 707

GROUP 12 — PICTURE ATLAS

Sections begin on pages 91, 217, 345, 469, 597, 721

GROUP 13 — POETRY & NURSERY RHYMES

Sections begin on pages 97, 225, 351, 475, 603, 729

GROUP 14 — POWER

The Very Heart of Matter .. 105
What is Electricity ? .. 233
The Ocean of Power We Live In .. 359
The Electric Current .. 481
The Story of the Dynamo .. 609
The Storage Battery .. 735

GROUP 15 — LITERATURE

The Realms of Gold .. 109
Poetry More Precious than Gold .. 239
Our First Storytellers .. 363
The Greatest English Book .. 485
The Book as Sweet as Music .. 613
The Poet Who Followed Chaucer .. 739

GROUP 16 — IDEAS

Movement .. 113
Justice .. 243
Courage .. 371
Truth .. 493
Direction .. 617
Distance .. 743

GROUP 17 — THE BIBLE

The Way Our Bible Came .. 117
The Bible Story of Creation .. 247
The Story of Cain and Abel .. 375
The First Days of Evil .. 497
Abraham, the Friend of God .. 621
Isaac and His Sons .. 747

GROUP 18 — THINGS TO MAKE & DO

Sections begin on pages 121, 249, 377, 501, 625, 749

GROUP 19 — SCHOOL LESSONS

READING
Learning to Read .. 129
Picture Books .. 258
Like A Flash .. 387
Making a Newspaper 509
Story Books and Word Books .. 633
Some New Words 758

WRITING
Learning to Write 130
Keeping a Diary .. 259
Without Mother's Help .. 386
Making a Cinema .. 511
Films & Advertising 634
Copying the Nursery Rhymes .. 759

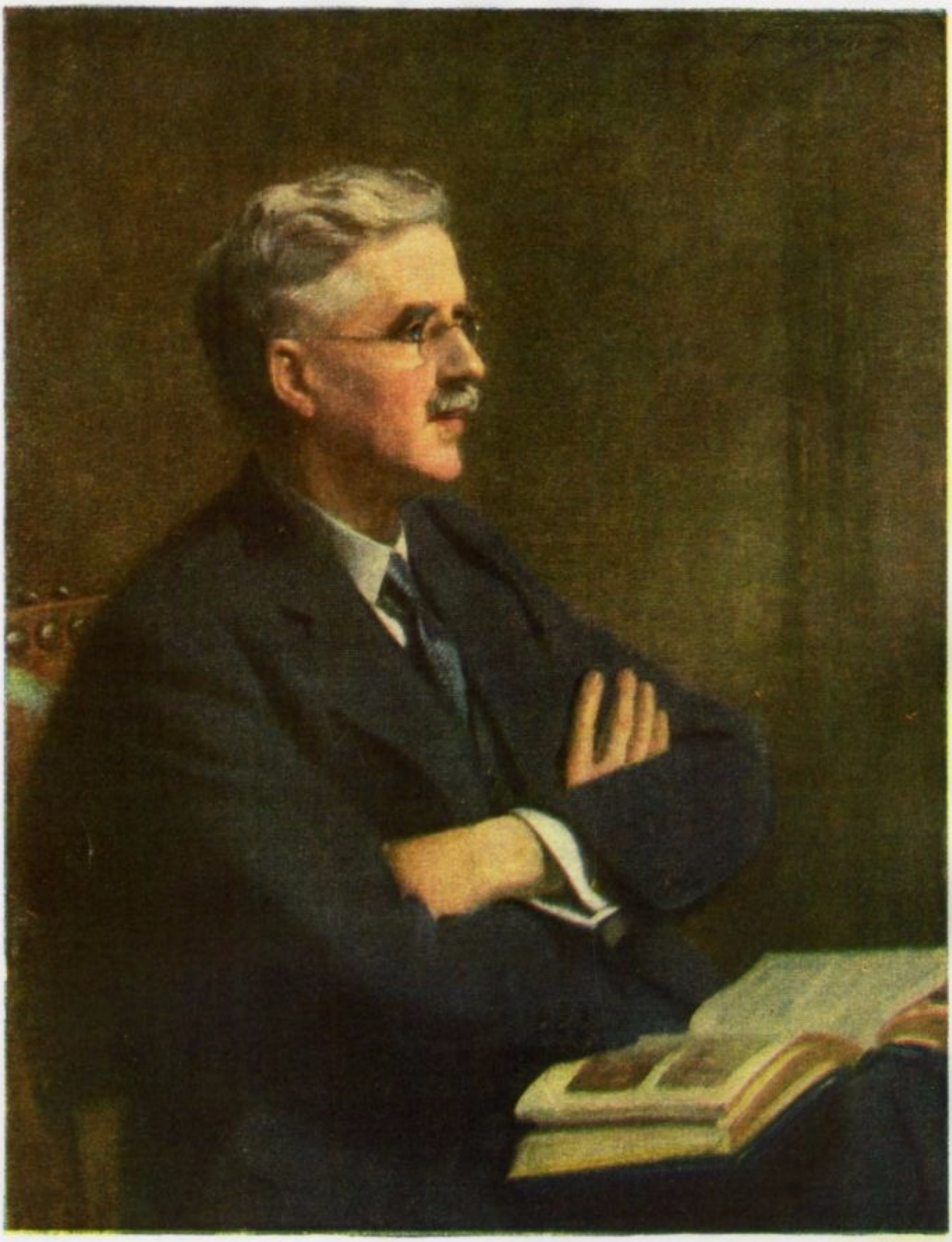
NUMBER
Learning to Count 131
The Names of Figures .. 257
Games for Counting 385
Remembering Figures .. 510

NUMBER (*continued*)
Adding Together .. 635
The Sums Get Harder .. 757

MUSIC
The Sounds We Hear 134
The Names of Sounds 262
More About the Names of Sounds 390
Clefs and Staves .. 513
Melodies for Voices 636
Musical Dialects .. 760

ART
Your First Picture .. 132
Patterns & Pictures 260
Patterns & Potatoes 388
Colours and Mixing Paints .. 512
Modelling in Clay .. 638
Ways of Modelling .. 762

FRENCH
Picture Lessons, 136, 264, 392, 515, 640, 764



ARTHUR MEE

From the painting by his friend Frank O. Salisbury, C.V.O.

To face Page 1

TO BOYS & GIRLS EVERYWHERE

You will find some day, my young friends, that, though words pretend to say what you mean, they do not say what you really mean at all, and I do not know of any words that can tell you all I want to say to you and all that this book means to me. Yet it is your book, and the story of it belongs to you.

Somewhere, in a corner of the world that a mother knows, was once a little lonely girl. When Master Jack Frost woke up from his sleep and drove the children in, our little lady would ride on her rocking-horse to Fairyland, or ring the bell on the door of her shop and pretend to sell things to somebody who was not there, or put her dolls to bed long before it was time, or tell her bear the strangest stories that ever were heard. When the sun was high in the sky she would talk to the fairies in the trees, or beg Robin Redbreast to come down and be friends.

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Our little maid had friends in every flower and tree that grows, in every wind that blows; and as the days began and ended, as weeks went by, and months rolled on, and years began to come, her little mind grew great with wonder, and she would find that behind the world and its play, behind all that she could see and hear and feel and know, was Something that she could not see and hear and feel and know, Something she could not understand.

And so there came into her mind the great wonder of the Earth. What does the world mean? And why am I here? Where are all the people who have been and gone? Where does the rose come from? Who holds the stars up there? What is it that seems to talk to me when the world is dark and still? So the questions would come, until the mother of our little maid was more puzzled than the little maid herself. And as the questions came, when the mother had thought and thought, and answered this and answered that until she could answer no more, she cried out for a book: "Oh for a book that will answer all the questions!" And this is the book she called for.

That is how our book began. Let us think we are sitting by the fire, little and big children everywhere (for children are we all), with storytellers and wise men to talk to us. Such a big book must have a big name, but the name is the biggest word in the book, and you will learn to say it easily and will know when you grow up that it is the only name that will really do.

It is a Big Book for Little People, and it has come into the world to make your life happy and wise and good. That is what we are meant to be. That is what we will help each other to be.

Your affectionate Friend, **Arthur Mee**

TO ALL WHO LOVE CHILDREN ALL OVER THE WORLD

THE Children's Encyclopedia is the first book that has ever tried to tell the whole sum of human knowledge so that a child may understand.

NOTHING could be more false to its purpose than to imagine that it seeks to cram the mind of a child with things that children need not know. It conceives the bringing up of a child as the supreme task in which we can engage, but it has no sympathy with those who would set a child down at a desk before it can run. It believes that a child is largely its own teacher, and that in a right environment it will teach itself more than all the schools can teach it.

IT cannot be urged against this book, therefore, that it has come to steal away the joy of childhood and put a bitter grinding in its place. It has come to bring more joy to childhood, believing that true joy of life comes from sympathy and understanding.

ONE half of the population of the world is made up of boys and girls learning at school and little children playing at home.

Is it beyond the resources of our language to convey to this vast multitude of men and women of tomorrow such an understanding of the world they live in as shall make their lives happier and save the waste of precious years?

THE creators of the Children's Encyclopedia believe that it is not, and they have built up the simplest system of knowledge they can devise.

LEFT to wander in this field, the child will find whatever it wants. For the youngest of all its nurse will find her lullaby. The child in the nursery will find its nursery rhymes and the best stories that have ever been told. The child who can be left out of doors to play will find here the beginning of its interest in natural things.

FOR the boy and girl at school these pages teem with precious things; for fathers and mothers, teachers and governesses, they may well become invaluable. It is a book for grown-ups and children. It is an encyclopedia of everything that comes into childhood, and by childhood it means all that period of life when the sensitive mind, the most marvellous instrument within the boundless universe, is being formed.

THE Children's Encyclopedia is what it claims to be. It is a children's book that children can understand. It is written in the words the children know. The writers of this book have been simple by being natural; they have made a children's book without childishness, a book that children may read because it is simple, and that men may read because it is plain.

IF saving of time is lengthening of life this book should be a priceless gift of years to the generation that is coming. There can be no doubt which of two children a teacher would prefer to take—one familiar with this book or one who is not. Nor can there be doubt that this book in the hands of boys and girls will add immensely to their understanding, lessening the difficulties of their school life.

HERE is a gift to the nation; a thing of measureless value to parents and teachers; a treasury for children to which they may come whenever they will, for whatever they will; an inspiration to childhood which will make these precious years a time of wise and happy building-up. It is a story that will never fail for children who will never tire; and it is the best of all stories, told in the simplest of all words, to the greatest of all ends.

Arthur Mee

PLAN & PURPOSE OF THIS BOOK

This book is arranged so that a child can understand it. Its purpose is to give boys and girls a conception of the world they live in and of their place in it.

It is not an Alphabet of Facts. Admirable as that is for a busy man, it is useless torture for a child. Nothing can be more forbidding to a young mind than a collection of subjects arranged in the order in which the accident of the alphabet brings them. The alphabet is for those who know; the Children's Encyclopedia is for those who do not know.

This book presents a simple scheme of universal knowledge which opens up a vision of the world as one great whole. It seeks to stir the mind and to awake a sense of wonder. Its purpose is to fascinate and educate.

It seeks to tell the story of everything a child can understand in the plainest way in which it can be told. It believes that a child soon becomes interested in everything about it, and it tries to explain, in a logical sequence of things, whatever the child's mind may begin to think about.

In its millions of words and its thousands of pictures it brings the mind of a child up from the beginning of the world into the midst of the thrilling age we live in. It comes up from the days when a man lived in a cave to the days when he sits by his fire, touches a switch, and hears a voice on any continent. It comes up from the days when a man could send a message to another only as fast as a messenger could ride to these days when he can send a voice round the Earth in a tick of the clock.

So vast a range of interest has this book, and it seeks to deal with it in simple ways. There are thousands of things shown in colour. There are birds and insects, plants and trees, seaweeds and shells, reptiles and fishes, all in colour; there are berries, grasses and ferns, minerals and tapestries and trains; there is the colour of old Empires, the colour of Nature, the colour from the world's great galleries. It may be claimed that in its pictures and in its colour this book has not been surpassed in our time.

And the range of its thousands of pictures is as wide as it can be. It has a unique Picture Geology of our island home, a specially compiled list of all the rivers in England, a coloured atlas of the world, a remarkable array of picture maps, and photographs of the peoples of the world, their homes, their industries, and their commerce.

The book has been arranged in nineteen main groups, seventeen groups of knowledge and two of practical teaching. Every group is numbered and runs through the book till it is completed; all we have to do is to

turn to the group we want and read the chapters from the beginning to the end. They move forward simultaneously, so that in fact this is a book of about a thousand chapters summing up human knowledge.

Here are the Nineteen Groups of the book and their contents.

THE 19 GROUPS OF THIS BOOK & WHAT THEY ARE ABOUT

1. Earth and Its Neighbours. The story of the Universe and all its wondrous worlds. Astronomy. Geology. Geography. Chemistry. Physics.

2. Men and Women. The life-stories of immortal men and women and their achievements.

3. Stories. The great stories of the world that will be told for ever. Golden Deeds. Fairy Tales. Legends. Fables. Chivalry. Stories of all Peoples. Old Tales of Greece and Rome.

4. Animal Life. Nature's wonderful family of living things in Earth and air and sea. Mammals. Birds. Reptiles. Fishes. Insects.

5. History. The march of Man from the Age of Barbarism to the United Nations.

6. Familiar Things. The things we see about us. Our Great Industries. How things are made. Where they come from.

7. Wonder. Plain answers to the questions of the children of the world on all subjects.

8. Art. The beautiful things in the treasure-houses of the world. Pictures. Statues. Carvings. Buildings. Colour.

9. Ourselves. The wonderful house we live in and our place in the world. Body, Mind, and Soul. Citizenship. Economics. Government. Law. The United Nations Organisation.

10. Plant Life. The marvellous story of the plants that cover the Earth. Botany and its wonders. Flowers. Trees. How things grow.

11. Countries. The peoples of all nations and their homelands.

12. Picture Atlas. Maps of all nations. Illustrated maps of historic and natural events.

13. Poetry. One thousand poems of all times and all countries, with verses and rhymes.

14. Power. Where power comes from ; what it does ; how it works. Electricity. Wireless. Motor-cars. Aeroplanes. Railways. Ships. Steam. Coal. Gas. Oil. Water. Machines.

15. Literature. The imperishable thoughts of men enshrined in the books of the world.

16. Ideas. Great words that stir the hearts and minds of all mankind.

17. The Bible. The story of the world's most beautiful book, and the Life of Jesus.

18. Things to Make and Do. Crafts. Games. Needlework. Cookery. Tricks. Puzzles and Problems. Scientific Experiments.

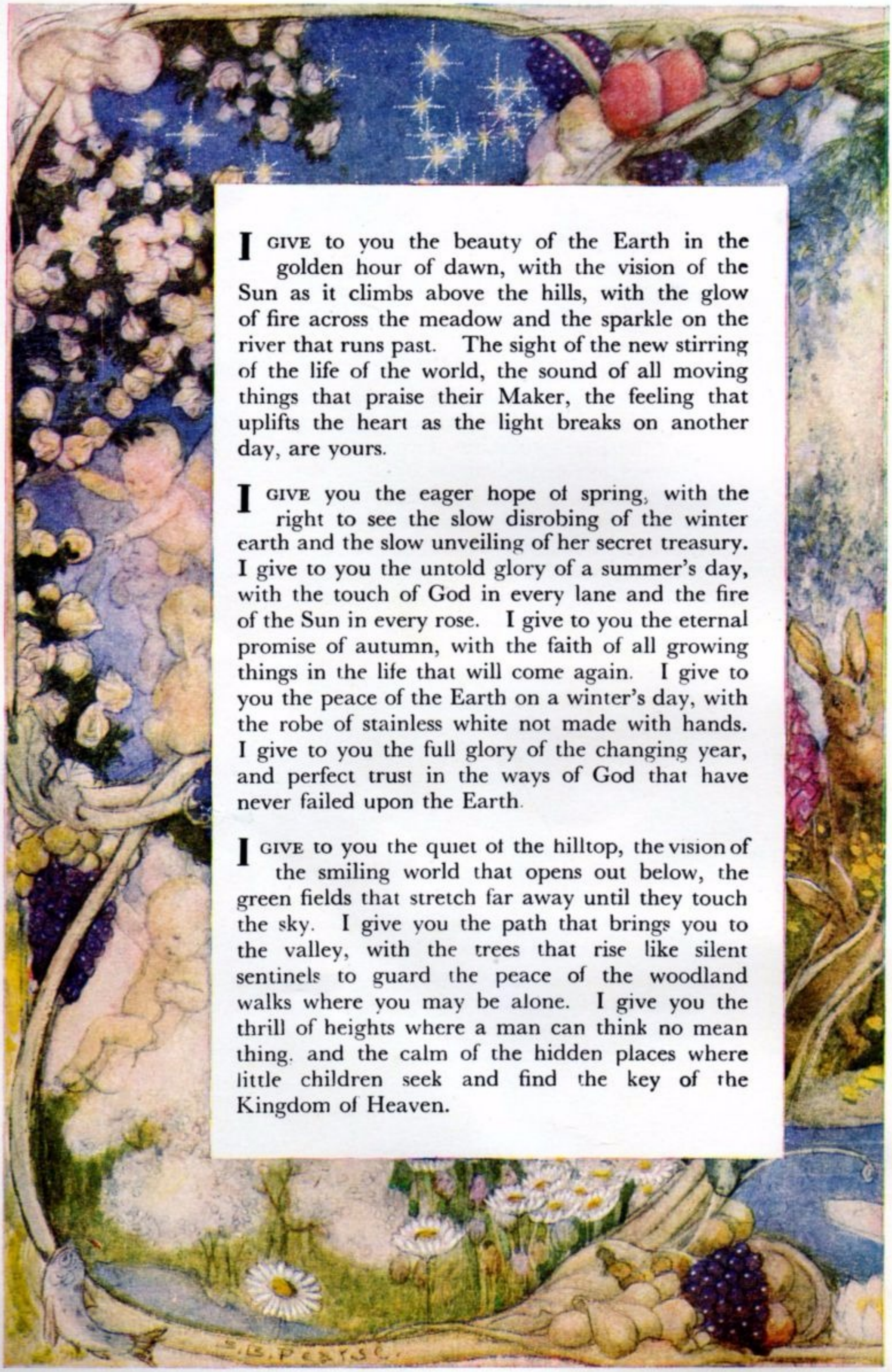
19. School Lessons. Simple learning made easy for very little people. Reading. Writing. Arithmetic. Art. Music. French.

We need mention only a few writers of this book to suggest the type of mind that has been enlisted in what we believe to be the greatest cause in the world, the educating of our children. Among them are Sir Arthur Thomson, the famous professor of Natural History for so long at Aberdeen ; J. A. Spender, the famous editor who had an unsurpassed knowledge of the world's affairs ; T. Thorne-Baker, with his remarkable record as a scientific investigator and inventor ; Harold Begbie, one of the most entertaining writers of his generation ; Dr. C. W. Saleeby, the popular author and lecturer ; Dr. Ronald Campbell Macfie, scientist ; Ernest Bryant, the writer on Natural History ; Charles Ray; and others whose expert knowledge has kept the information in these pages in step with the times.

Through all the things that are written here breathes a spirit which no dark days can conquer. This book is written from beginning to end in the faith that all is well. It believes in God and man and in our race. It believes in loving our country as the noblest country that has ever been, and in loving mankind no less. It believes that character is the greatest thing in the world, and that by teaching our children to do right, to love truth, and to cherish fine things, we can save mankind from all its troubles and build up the Kingdom of Heaven.

I, NATURE, give to you, to be yours for ever and ever, the right to the free enjoyment of this world. I give to you the years that are before you, and the world that is about you.

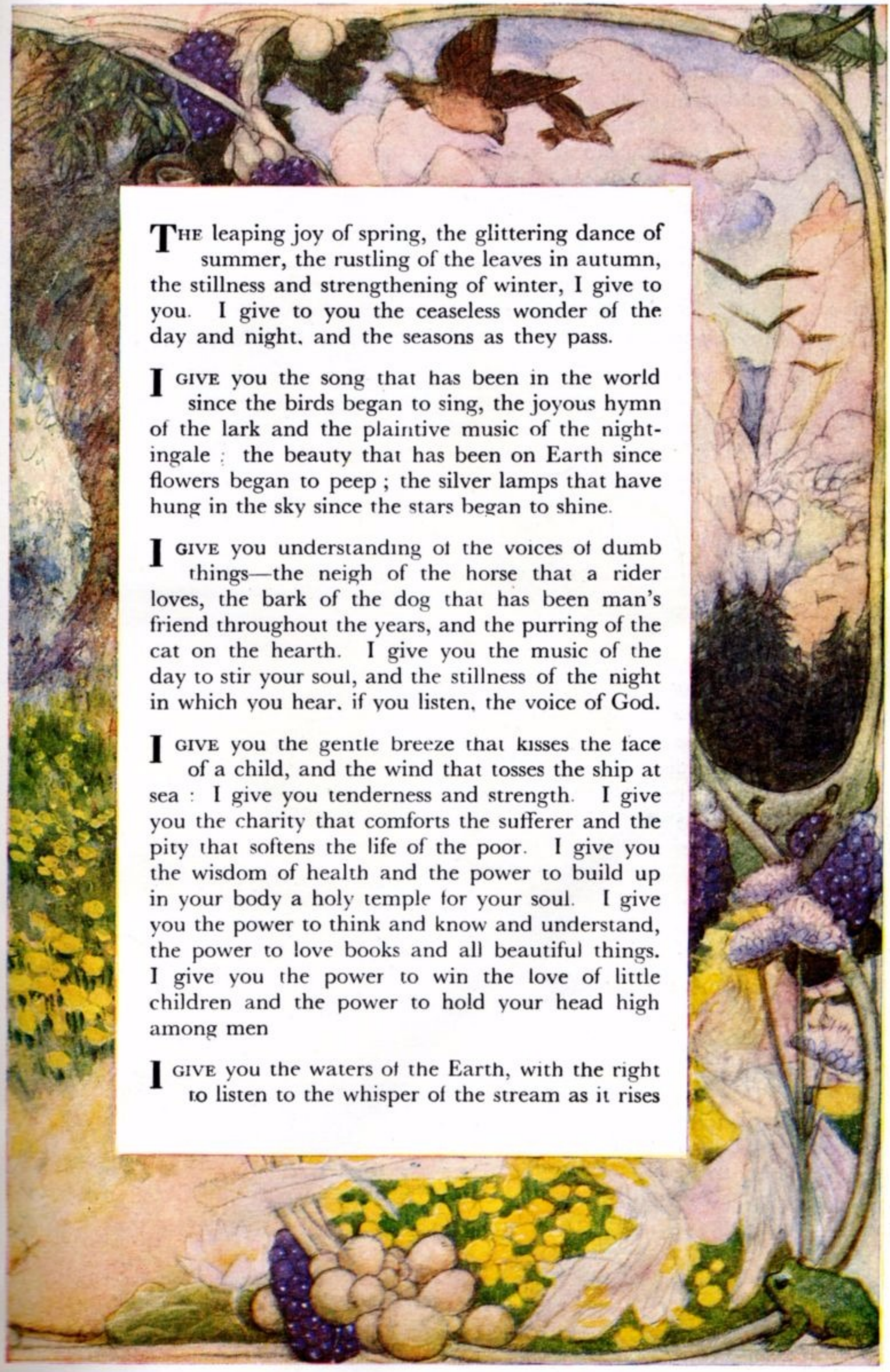
I GIVE to you the Sun by day and the Moon and stars by night, with the power to wake as the Earth rolls into the light of the Sun, and power to sleep when the night comes.



I GIVE to you the beauty of the Earth in the golden hour of dawn, with the vision of the Sun as it climbs above the hills, with the glow of fire across the meadow and the sparkle on the river that runs past. The sight of the new stirring of the life of the world, the sound of all moving things that praise their Maker, the feeling that uplifts the heart as the light breaks on another day, are yours.

I GIVE you the eager hope of spring, with the right to see the slow disrobing of the winter earth and the slow unveiling of her secret treasury. I give to you the untold glory of a summer's day, with the touch of God in every lane and the fire of the Sun in every rose. I give to you the eternal promise of autumn, with the faith of all growing things in the life that will come again. I give to you the peace of the Earth on a winter's day, with the robe of stainless white not made with hands. I give to you the full glory of the changing year, and perfect trust in the ways of God that have never failed upon the Earth.

I GIVE to you the quiet of the hilltop, the vision of the smiling world that opens out below, the green fields that stretch far away until they touch the sky. I give you the path that brings you to the valley, with the trees that rise like silent sentinels to guard the peace of the woodland walks where you may be alone. I give you the thrill of heights where a man can think no mean thing. and the calm of the hidden places where little children seek and find the key of the Kingdom of Heaven.



THE leaping joy of spring, the glittering dance of summer, the rustling of the leaves in autumn, the stillness and strengthening of winter, I give to you. I give to you the ceaseless wonder of the day and night, and the seasons as they pass.

I GIVE you the song that has been in the world since the birds began to sing, the joyous hymn of the lark and the plaintive music of the nightingale : the beauty that has been on Earth since flowers began to peep ; the silver lamps that have hung in the sky since the stars began to shine.

I GIVE you understanding of the voices of dumb things—the neigh of the horse that a rider loves, the bark of the dog that has been man's friend throughout the years, and the purring of the cat on the hearth. I give you the music of the day to stir your soul, and the stillness of the night in which you hear, if you listen, the voice of God.

I GIVE you the gentle breeze that kisses the face of a child, and the wind that tosses the ship at sea : I give you tenderness and strength. I give you the charity that comforts the sufferer and the pity that softens the life of the poor. I give you the wisdom of health and the power to build up in your body a holy temple for your soul. I give you the power to think and know and understand, the power to love books and all beautiful things. I give you the power to win the love of little children and the power to hold your head high among men

I GIVE you the waters of the Earth, with the right to listen to the whisper of the stream as it rises

in the hills, to the chatter of the river as it gathers and widens, and to the shout of the cataract as it splashes through the rocks. I give you the beauty of the moving sea when it kisses the Sun, and the vision of the liquid peaks that rise and fall. I give you the slowly creeping waves that have never been still since the seas were made, and the rocks they have ground into golden sands

I GIVE you the oceans in calm and storm, with the waters that dance in the air, the showers and the winds, the snow that clothes the world anew in a night, the rain that taps on the window, and the rainbow that springs out of the Sun.

I GIVE you, free for ever, with the right to take whom you will, the full enjoyment of the Natural Gallery of everlasting pictures, and the right to see the unveiling of all sunsets, the covering of the heath with red and gold, the floating past of the clouds that ride like mountain peaks across the sky. I give you access to all the bushes laden with berries, to the daffodils and the violet beds, to the place where ferns and mosses hide, and to the tulips when they hang their heads at night.

I give you the time of waiting and the time of fulfilment

I GIVE to you the power to remember and the power to forget, and I give you the strength to forgive. I give you the love of the quiet places where the burden of the petty things will fall away. I give you the right to wander by the brook that babbles o'er the pebbles, to rise early in the morning and see the dew on every buttercup, to lose yourself among the heather and in the field of the cloth of gold.

I GIVE you the Past, with its heritage of good and ill. I give you the Present, with the opportunity that knows no bound. I give you the Future, with the years that never end and know no sorrow.

I GIVE to you the long, long thoughts of youth and the memories of the years; the hope of the dawning life, the dream of the days to be, and the looking-back. I give you the yearning and the craving that make life sweet. I give you the time of waiting and the time of fulfilment. I give you the spirit that good fortune does not mar nor ill fortune break.

I GIVE you the calm that looks out upon the world and will not be discomforted. I give you the heart that does not quail; the courage that does not flinch; the faith that will not fail in the Valley of the Shadow. I give you the power to believe in the everlasting spirit of the world

I GIVE you the love of true things, the love of pure things, and the companionship of sweet liberty. I give you the scorn of all ignoble things, the hate of all things evil, and the strength to march breast-forward against them until they are destroyed.

I GIVE you the promise that they shall be destroyed, that the face of the Earth shall be fair, that the mind of man shall be free, that all that come from God shall yet return to Him, that little children yet shall see the Dawn that no man knows.

EARTH AND ITS NEIGHBOURS

The Story of the Boundless Universe and All Its Wondrous Worlds

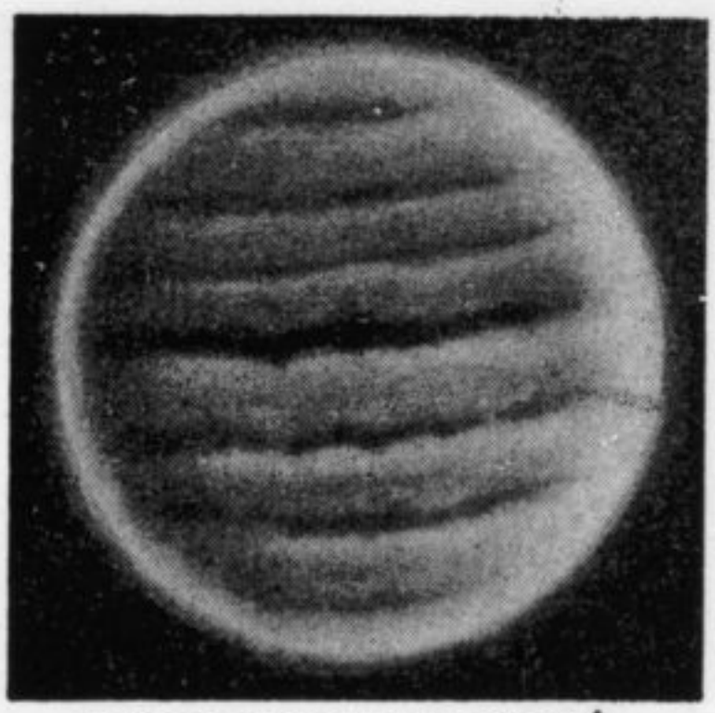
What This Story Tells Us

HOW still the Earth seems on a moonlight night ! Yet the Earth has never been still for a moment of time. We do not know how long it has been spinning, but for millions and millions of years it has been flying like a ball through space. It began as a cloud of fiery gas ; it cooled and shrank ; and at last it became hard and round like an orange. And, as we now know, the Earth is like a speck in a boundless universe, one of the smallest of a thousand million worlds, all moving on and on in perfect order through space that seems to have no end. What are they like ? Are they alive ? Are little children playing there ? Perhaps not ; we do not know. But they have their place in God's great scheme of things, and here we will read all we can know of them until the day when our eyes shall see and our minds shall understand the marvellous purposes of God.

THE BIG BALL WE LIVE ON

THE big ball we live on, with its mountains, and rivers, and seas, and deserts, and forests, and plants, and animals, is only a speck in the vast infinity of space.

It is surrounded by millions of suns and planets burning and spinning, and by millions of suns and planets born untold ages before the Earth came into being, which have now burnt out and ceased to spin. In comparison with its own Sun, the Earth is a tiny thing, and if it were a little nearer that shining star it would be drawn into one of its fiery whirlpools and devoured like a daisy in a prairie fire.



EARTH COOLING DOWN

And there are many suns in space millions of times as large as ours. Besides suns and planets, too, there are tremendous clouds of glowing substance known as nebulae, so huge that the Earth in the middle of one of them would be like a pea in the Pacific Ocean. In space itself the Earth is quite lost. Think of the width, and breadth, and height of space !

The Sun seems a long way off, but its light takes only a few minutes to flash across to us, whereas astronomers who have been measuring the distances of stars have calculated that some of them are so far off that light, which travels 186,282 miles in a second, takes hundreds of years to reach us. An express train would take hundreds of millions of years to cover the distance. Even farther off than that there are stars, for every time a bigger telescope is made new stars come into view. The big Hooker telescope on Mount Wilson revealed thousands of stars out beyond the stars that were previously known.

So little, then, is our big ball, when we look at it amid the suns and nebulae in the immensity of space. But we must not, therefore, think less of our Earth.

We who rush round the sun in such a wonderful chariot, with the stars millions of miles away shining into our eyes, must recognise that the Earth's place amid the suns is a place of wonder and a place of honour. We are proud when we go sixty miles an hour in a motor car along a road ; but what an adventure it is to go flying a thousand miles a minute round the sun, companioned by Jupiter and Venus and Mars—to go flashing with the Sun along pathless space towards some unknown goal. Life can never be a stupid and dull and sordid thing if we educate

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THE CLOCK OF THE WORLD—THE MARCH

Here our scientific artist, Mr. G. F. Morrell, gives us a Clock of the World's Life.

By their study of the radio-active elements in the Earth's crust and the time they take to lose their radio-activity and change into stable elements, scientists calculate that the Earth's crust may have been formed as long ago as 3,000,000,000 years. It is estimated, moreover, that life has existed on our planet for at least 500,000,000 years.

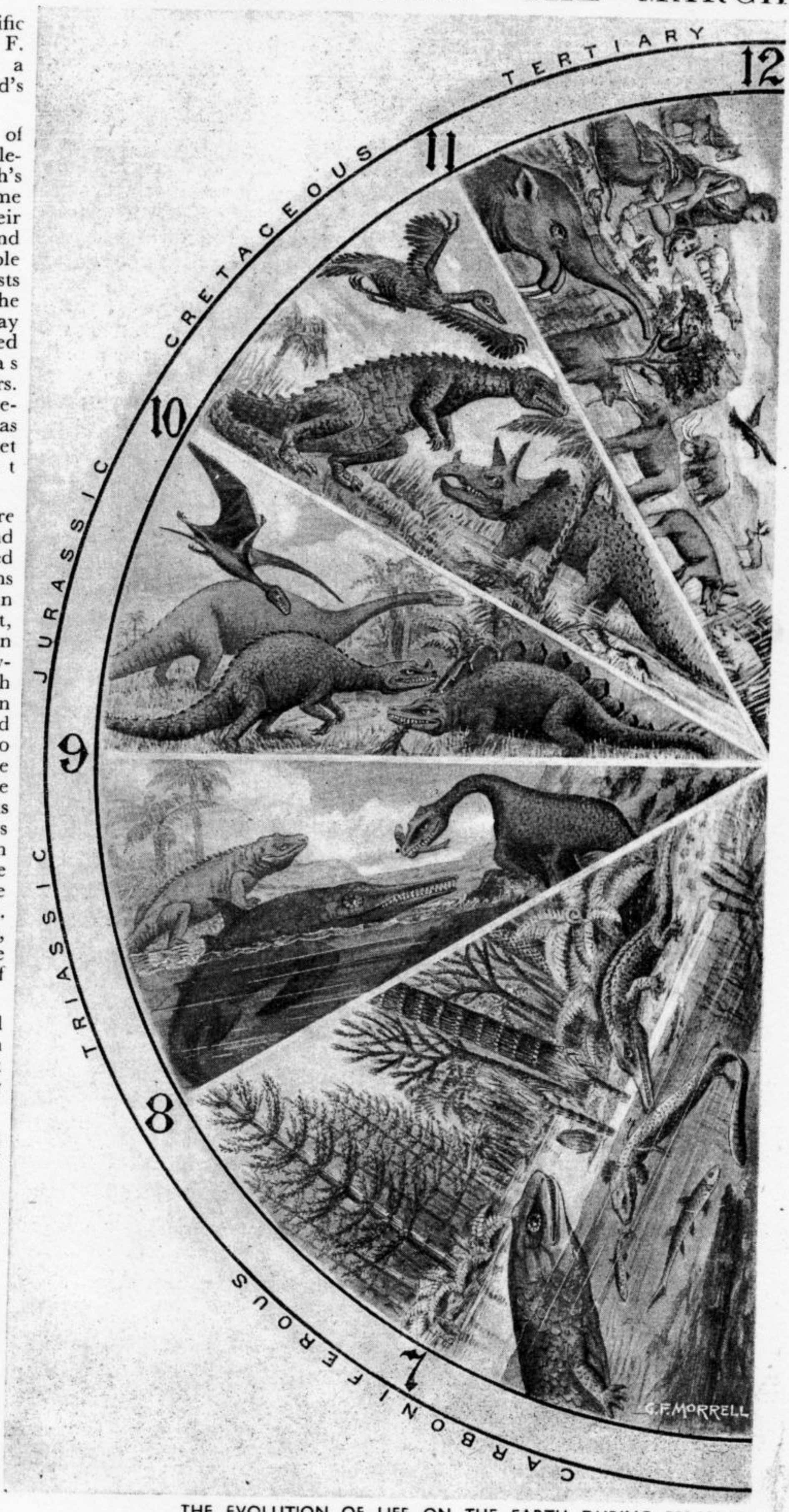
We can the more readily understand the period occupied by the chief forms of living creatures in their development, until at last Man appeared, by showing them as though on a clock face on which the hour hand has taken 500,000,000 years to make one revolution. On the outer edge of this clock of the world's life are shown in their proper order the names of the successive geological periods. The sections do not, of course, show the relative lengths of these periods.

In the first period came little worms in the sea, the first shellfish and the jolly little trilobites.

Between 2 and 3 sea-scorpions like big lobsters developed; and between 3 and 4 the first fishes with backbones. It was the first appearance of the Backbone.

From 4 to 6 the armoured fishes grew strong and fought the giant lobsters. It was the first great victory for the Backbone which was to conquer all things.

From 6 to 8 giant trees flourished, and



THE EVOLUTION OF LIFE ON THE EARTH DURING 500,000,000

OF LIFE DOWN THE LONG ROAD OF TIME

YEARS—FROM THE CAMBRIAN PERIOD TO THE ARRIVAL OF MAN

our coalfields were really fields of vegetation. So luxurious was their growth that they seem to have attracted life ashore. It was the age of the Amphibians; feet and legs appeared.

From 8 to 9 was the time of the sea lizards.

From 9 to 10 the reptiles developed; Brontosaur and Stegosaur roamed the forest; flying dragons appeared, followed by birds.

From 10 to 11 was the Cretaceous Period, when the chalk beds were laid down in the sea. The reptiles grew grotesque and terrifying, and the first birds developed, with big claws and teeth, like their reptile ancestors. Then, also, mammals developed, little creatures like opossums, and it is strange to think that they were one day to dethrone the mighty Dinosaurs.

From 11 to 12 is the Tertiary Period, at the end of which we live. During this time mammals have grown mightily, and the Dinosaurs have disappeared. Early in this period came the Dinotherium and the four-tusked Mastodon; and the six-horned Tinoceras fought the Sabre-toothed Tiger. Perhaps half-way through this period came the little lemur-like creatures which developed into monkeys and later into apes; and afterwards, late in the last half-hour of the clock, Man himself appeared.

It may have been a million years ago; we do not know. His written history—written in stone and on the rocks, or on papyrus leaves—is 10,000 years old, like a scratch of a pin in the last hour of the clock.

our imagination to realise through what a wonderful universe we are rushing.

Think, too, of the marvellous making of our little world. It is interesting to watch a sculptor making a figure out of marble, or to watch a painter putting trees and hills and faces on canvas ; but on our journey through space we can watch a much more wonderful artist—we can watch the Creator's work of making suns and planets and find out how this world came into being.

THE CLOUD THAT IS BEGINNING TO BE A SUN LIKE OURS

What we call empty space is not empty ; it is full of an invisible wonderful something we call ether, and it is this ether which conveys light to us, and tells us of the house across the street, of the suns millions of miles away, of the friend across the room. Now at places in space something miraculous seems to be going on in the ether.

We see a glowing cloud, millions of miles in diameter, which has blossomed in the invisible ether. It certainly was not always there, and if it were not always there some Power must have made it. God made it. He is beginning to make it into a sun. When astronomers examine such a cloud with telescopes and spectroscopes they discover that it is composed chiefly of the two gases, hydrogen and helium.

That does not seem very wonderful, perhaps, but chemists believe that all the elements in the world are built up of atoms of these two light gases. In the cloud, hydrogen and helium are being prepared to make all the other elements that go to make suns and planets. At this stage the cloud is very thin, thinner even than the air we breathe ; but as the gases form, and as new elements are constructed, the cloud contracts, or shrinks, and grows denser and hotter. The chemical processes going on, and the shrinking of the cloud, both produce great heat, and so the cloud becomes a blazing sun like ours.

THE WONDERFUL THOUGHT THAT SO MUCH CAME FROM SO LITTLE

But at a certain point the heat leaks away faster than it is formed, and the sun cools, and as it cools down heavier elements are formed—the gases become partly fluid and partly solid.

We can see in space plenty of suns which have reached this stage, and the spectroscope shows that they contain numerous elements, including iron and other metals. In the cloudy stage astronomers call the sun a giant sun, and in the more condensed stage they call it a dwarf sun ; and finally the dwarf sun cools down entirely and becomes a dead, dark sun.

That is a very brief sketch of how suns are made. But sometimes, while suns are contracting, their surface breaks up and the fragments become planets revolving round them. Something of that sort happened to our Sun ; and the fragments grew into the planets, and one of the planets is our Earth.

It is surely wonderful to think that the Earth was made out of the invisible ether of space, and that at one time all its rocks and seas and animals and plants were nothing but hydrogen and helium gas ! It is surely wonderful to think that a Great Power could bring so much out of so little ! And one of the most wonderful things in the making of the Earth was the final steps that made Life possible.

OUT OF THE FLAME AND FIRE CAME THE VERY THINGS LIFE WANTED

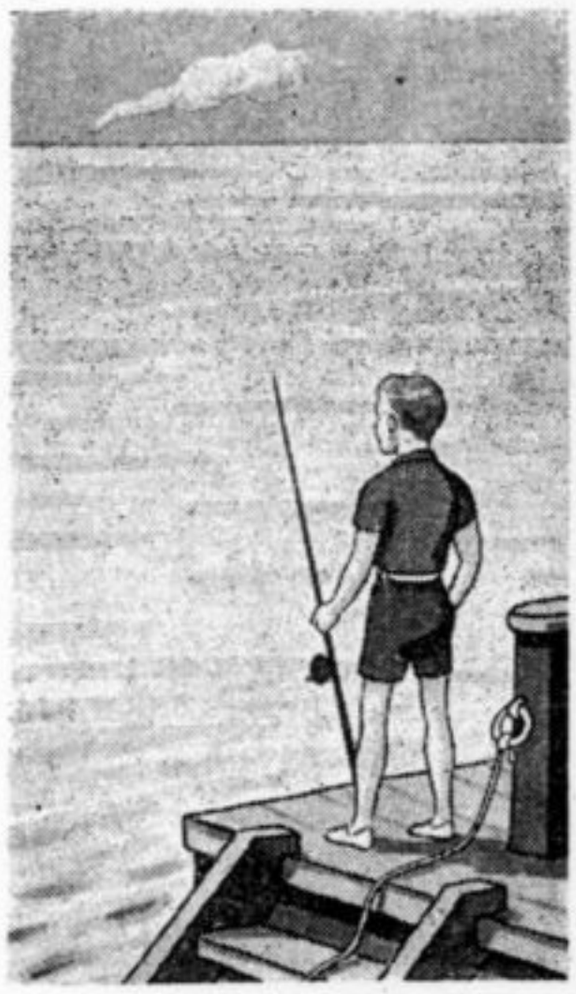
At first this big ball of ours was simply a globe of flaming gases and molten metals. As it cooled it formed a solid metallic crust, and as the metal cooled and solidified and condensed, it squeezed out slag as cooling iron in an iron foundry does. This slag formed the early crust of the Earth. And the amazing thing was that the crust contained iron and lime and sulphur and sodium and potassium—*just those elements which were necessary to life.*

More amazing still, when the cooling crust cracked, and when giant volcanoes spouted all over the world, out of the bowels of the Earth came steam which condensed into water and carbon dioxide gas, and so the Earth got rivers and seas and an atmosphere. After millions and millions of years of flame and fire, of seething and boiling and bubbling, there came out of this fragment of the Sun *exactly the right things to make life.* The water, lifted and tossed by the air, broke down the crust into soil and mud—into the clay of life.

All that is amazing and wonderful, but all would have been in vain if the Sun had not been shining across space nearly a hundred million miles away. When the Sun broke up into bits, and the bits went flying as fiery planets round it, it might have seemed an unfortunate accident;

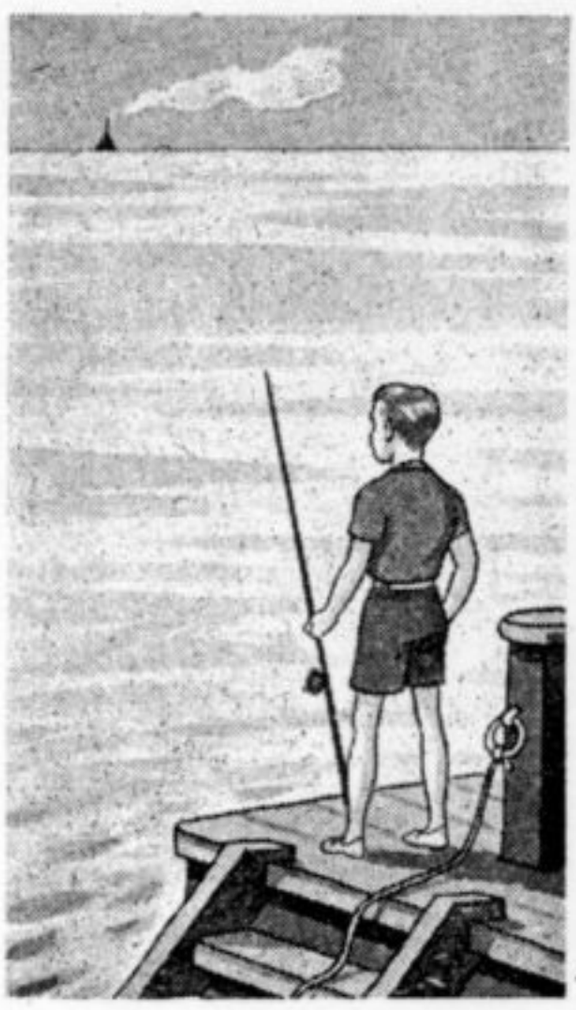
FROM SUCH A CLOUD OF FIRE CAME EARTH

THE NEBULA OF ANDROMEDA AS SEEN THROUGH THE BIG TELESCOPE AT THE YERKES OBSERVATORY IN CHICAGO



1. The Earth is not flat, but round like an orange. We know this by the way a ship comes into sight at sea.

2. At first we see only smoke. Then we see the top of the mast, as if the ship were climbing up a hill.



3. Then the bows appear, and we see the vessel rising higher and higher.

HOW WE KNOW THE EARTH IS ROUND

but if the Sun had not flung forth the planets there would probably be no living things in the Solar System today. As it is often best for children to leave their parents and live their own separate lives, so it was best for the Earth to be parted from the Sun and go its own way. But the Earth still revolved round the Sun, and the rays of sunlight still reached the Earth, and it was these rays of sunlight that made living things, even as today they make food for us all.

How living things were manufactured from the materials ready in the Earth's crust and in its atmosphere nobody knows, but it probably came about in this way. On the Earth was the wonderful fluid water, with many substances dissolved in it, and the wonderful gas carbon dioxide which we can see bubbling in a soda-water syphon any day. On the gas dissolved in the water the Sun shone down, and it has been proved that when the Sun shines on such a solution some of the rays form the poison called *formaldehyde*, and other rays manufacture starch out of the poison ; and starch is perhaps the most important substance in the world in relation to life. It contains some of the energy of the sunlight which made it, and this energy comes forth when oxygen is joined to it. When we burn starch, for instance, we get the Sun's energy out of it in the form of light and heat. We know, too, that all the energy of living depends on starch food. The Sun makes starch out of water and carbon dioxide in green plants ; animals eat the starch, and all life depends on the energy of the Sun contained in that compound ; all the tissues of living bodies are built out of it by the processes of digestion.

Now many people believe that Life itself originated in some such way—first the poison that in itself is destructive to life ; then starch ; then from this starch the energetic substance of life called protoplasm. That may or may not be so ; but it is certain that today all living things depend on the energy of the Sun, and that without sunlight life could not be.

In many ways this arrangement of a Sun to put energy into the gas and water of the Earth would seem to be the contrivance of a foreseeing Mind, and it is really a much more complicated arrangement than it looks ; for the Sun's rays would not only make starch but would

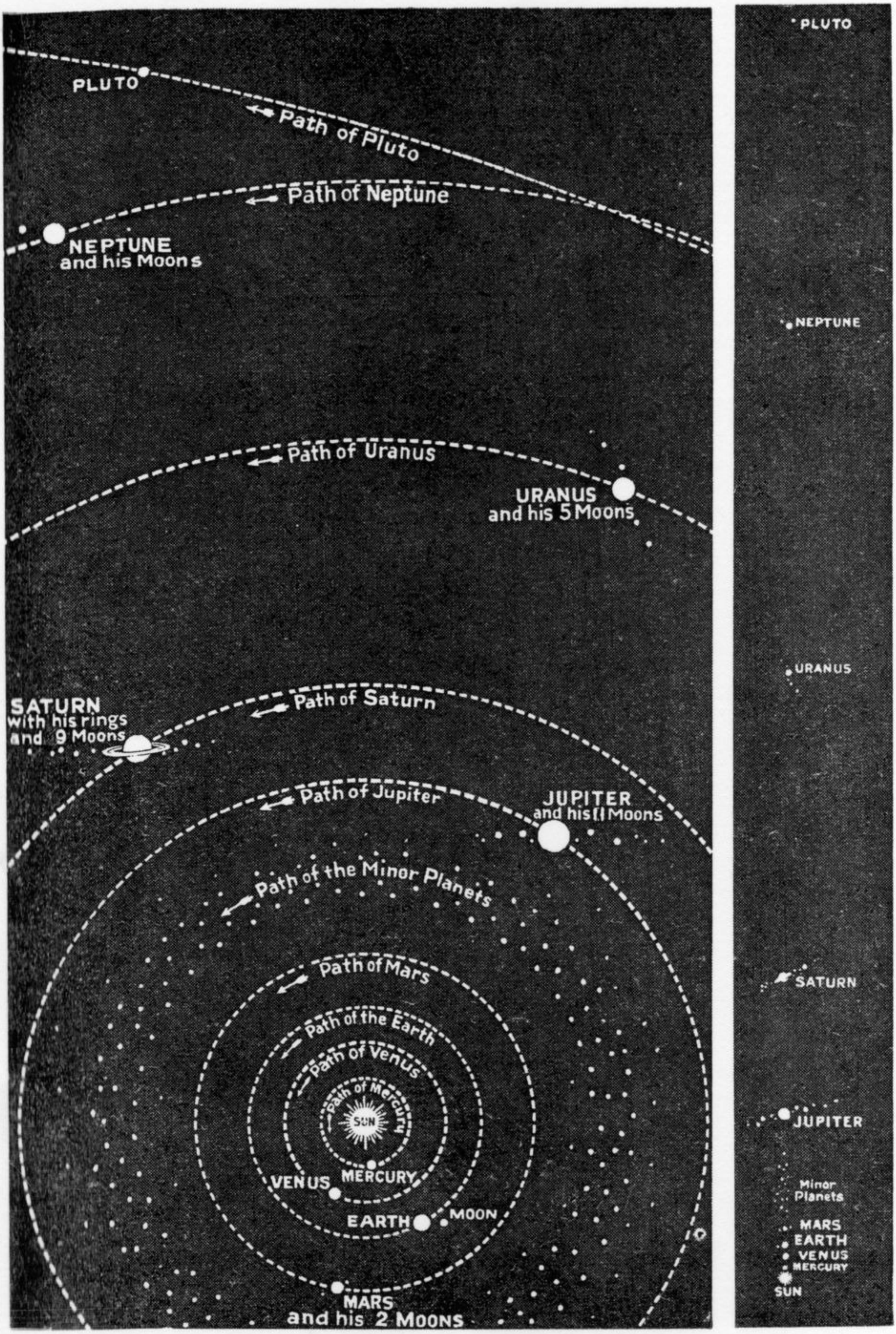
4. If the Earth were flat we should see the whole ship at once, not the mast first and the rest bit by bit.

5. But we do not see it that way. We see the ship rising as if it were sailing up the other side of a ball.

6. At last the ship is over the circle, sailing clear on the top of the ball.

THE SHIP COMING UP THE HILL

THE SUN AND HIS FAR-AWAY WORLDS



The Sun is in the centre of our part of the Universe. Around him travel for ever a family of worlds which we call planets. The Earth goes round the Sun once in a year, but Pluto takes 248 years to go round. This picture is a diagram of the Solar System; relative sizes and distances are not in proportion.

slay all living things were it not that the atmosphere holds back most of the rays. Exactly the right rays are let through to make starch without destroying life.

In some such way Life began and the conditions on the planet were such that it multiplied and developed till now Earth, air, and sea swarm with myriads of living creatures.

Not only in starch do we enjoy the energy of the Sun that was stored up in the starch of green plants for hundreds of thousands of years. Who could have imagined that all the decaying vegetation in ancient swamps and jungles would one day drive the machinery of unborn men ? Yet life as it is today would be quite impossible if our wonderful little planet had not hoarded this energy for us. With two arms and hands a man can do a good deal, but the writer is sitting at a mahogany table brought from a tropical forest, writing with a steel pen by electric light. He could not have the table, nor the pen, nor the light, except for the energy of coal. A civilised man requires and possesses for his needs not only the energy of two arms but the energy of twenty, and eighteen of these are the black arms of coal.

EVERYTHING ON EARTH MADE AND PREPARED FOR MAN

Everything in this wonderful planet of ours seems to have been made for us, and, in wise, far-seeing ways, prepared for us. Think of glass, and what it means to us ! Think what the microscope and telescope have revealed to us ! Think what eye-glasses mean to so many ! Yet silicon, the element essential for glass, was collected for us in sea-water by countless myriads of tiny sea organisms which made of it little glass shells, often of delicate beauty.

Wonderful changes have taken place in our world since it first became the home of living creatures. Its crust has been broken, and cracked and crumpled ; its ocean beds have been puckered up into mountain ranges ; continents have sunk beneath the seas. Most of the chalk of England was formed in the bottom of the sea ; and the granite of Scotland is the remnants of mighty volcanoes. Even the Himalayas rose from the ocean ; the Dolomites were once coral reefs ; and many parts of the Earth's surface have been alternately land and ocean floor. Earth has had its tropical periods, too, when great forests and jungles grew in the Polar regions, and it has had its Ice Ages, when almost all Europe was under glaciers. It has had its Age of Insects, its Age of Reptiles, its Age of Mammals, its Age of Man.

Yet evermore the Earth has gone spinning round the Sun, and evermore Life has blossomed more richly. At first its most wonderful blossom achievement, Man, hardly knew where he was, and it was many ages till he discovered that the Earth was a round ball spinning on its axis and revolving round the Sun. At first he naturally thought the Earth was flat, and that the Sun went round it ; but bold men who sailed about the world proved it to be round, and other clever men discovered the revolution of the planets.

THE SPINNING OF THE EARTH AND WHAT IT GIVES US

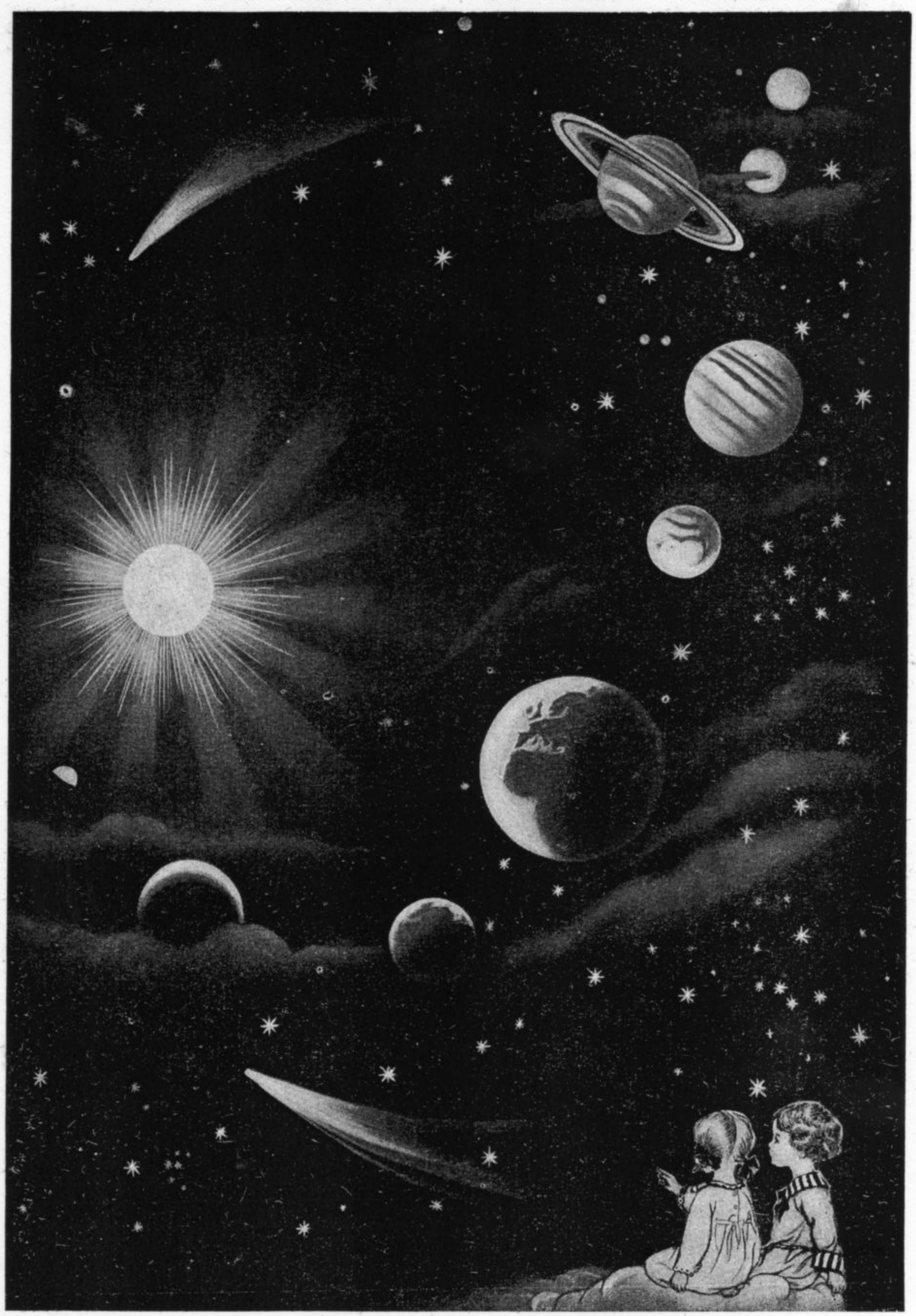
The spinning of the Earth on its axis is a very strange thing ; but the Sun also spins, and all the other planets spin, and it is probable that it has meanings we do not understand. But some of its uses to us we do understand ; it gives us alternatives of day and night which help us to divide our lives between activity and rest. It produces the tides, and it is the cause of some of the great regular winds which regulate and modify the climate of the Earth.

The Earth does not spin quite upright, but is inclined a little on its axis, and this slanting of the Earth as it revolves round the Sun is the cause of the seasons in the North and South Hemispheres. At one point in the Earth's revolution the North Pole is leaning towards the Sun and the South Pole away from it ; and at another point in its revolution the South Pole is leaning towards the Sun and the North Pole away from it ; so we have summer and winter alternately in each of the two halves of the globe. During its revolution round the Sun the Earth turns on its axis almost exactly 365 times, and so the year has almost exactly 365 days.

THE BIT OF THE EARTH THAT BROKE OFF LONG AGO

When we are talking of the wonders of the world we must not forget the Moon which revolves round it once every twenty-seven days. As the Earth is a bit of the Sun, so the Moon is a bit of the Earth. It was torn off by the tug of the Sun from the molten Earth ages and ages ago. Even as the Moon nowadays raises tides in the sea, so the Sun in those ancient days raised tides in the half-molten metal as it whirled,

THE PROCESSION OF THE WORLDS



This is what we should see if we could stand out in the Universe and watch the great procession of the worlds that make up what we call the Solar System. In the centre is the Sun, 93 million miles away. Nearest to him is Mercury, then Venus, then our Moon below the Earth. Above the Earth is Mars; above Mars is Jupiter, a molten world not yet cooled down; then comes Saturn with his marvellous rings; beyond Saturn are Uranus and Neptune; and at the top in the middle is Pluto.

and so a bit of the half-molten metal was partly whirled and partly tugged away, and went rushing round the Earth, at first quite near it. Like the Earth, it had great volcanoes spouting fire, and it must have been a splendid spectacle as it rushed round the Earth dragging great molten tides after it. But it could not hold the gases and the water vapours within it as the Earth did ; it was too small to have sufficient gravitational force, and so, even though it had probably the same elements as the Earth in its crust, it never managed to produce plants or animals.

In time this fragment of the Earth got farther and farther from the Earth, and in time it cooled down, and now it is like an enormous piece of dry slag covered with huge extinct volcanoes, and it keeps always the same side to the Earth.

Could there be a more marvellous world than this planet of ours, spinning on its axis and racing round the Sun between Venus and Mars, with the silver Moon shining on its oceans ? There are bigger suns and planets than ours, but is there any with such a wonderful heritage of life?

And the Earth is the home of mankind, full of beautiful and wonderful things. We are all rushing on, no man knows where, through the ocean of infinite space. We are spinning round at thousands of miles an hour, we are revolving round the Sun at eighteen miles a second, but so smooth is the motion that we feel neither the whirl nor the rush. On and on we go, and when the Earth has revolved some seventy times round the Sun, you, I, and each one of us, must go perhaps on a still longer and more wonderful journey. But while we are in the world let us try to explore its wonders and understand it, seeing in all things the wisdom and love of God who made us out of a cloud of gas ; and let us realise that, vast as is the universe, even so vast is the soul that has been given to us to comprehend it.

THE PIECE OF THE EARTH THAT BROKE OFF—THE MOON THROUGH A BIG TELESCOPE

The Story of Immortal Folk Whose Work Will Never Die

What This Story Tells Us

NONE of us can ever pay the debt we owe to those who lived before us—to the men who made life easier and happier and healthier for us all. Have you ever thought, when looking through the window, that once there was not a pane of glass in the world ? Then a man dug things out of the earth, mixed them, and made Glass. Who was he ? We do not know. Nor do we know the man who found fire, or the man who found iron. Here, however, we shall read of some of those immortal men and women whose work is known and will never be forgot—those who wrote books and painted pictures, who found power and made ships and railways and aeroplanes, who gave us light, who conquered plague and found out the laws of health, who gave us liberty and law and knowledge. Let us never forget the debt to them that we can never pay.

THE FIRST FLYING MEN

MEN have always been jealous of the birds. As far as legend carries us back we trace man's yearning to fly.

Think what it would have meant to men to fly in the days when they had neither trains nor ships nor roads ; when the seas were still unplumbed and mountain barriers raised their heads forbidding man to cross them ; when a trip from London to York by coach was so alarming that before starting men made their wills and took leave of their families as solemnly as if they were going forth to war.

King David sighed for the wings of a dove. The Greeks represented one of their legendary heroes with wings of wax, which melted when he approached too near the sun.

Roger Bacon, whose genius towered like a beacon-light over a dark sea of ignorance, had a flash of inspiration when he suggested that the upward way of man must be in a vessel made lighter than air by the use, in a thin metal cylinder, of either heated air or something which seems to have been a sort of gas. But he might as well have whispered his ideas to the Moon, so far ahead of his age was he. Then there were those who, through ages of experiment, cracked their skulls or maimed

THE LANGLEY FLYING MEDAL

themselves by trying to match the way of a bird in the air, with the aid of flip-flap paddles or sail-like wings worked by the arms and legs.

Nothing came of all the old experiments of our ancestors, except to set an example to posterity of courage and fearless endeavour. They could raise glorious cathedrals, but they could not think out the mechanism of flying. When the first flight was made, it took place at what seemed to be the predestined hour.

Henry Cavendish discovered hydrogen in 1766 ; the first balloon was sent up in public in 1783—but not with hydrogen, which had to wait a little longer to be harnessed. It was a puff of smoke that suggested the balloon. Two brothers, Joseph Michael and Jacques Etienne Montgolfier, sons of a paper-maker near Lyons, watching the smoke rising from a fire, speculated as to whether, being lighter than air, smoke would lift a weight. They tested the question by inflating a paper bag with smoke, and the bag floated up to the ceiling. The brothers thought some special property in the smoke was responsible for the lifting power, but they could not do much because they were unable to get enough smoke into their

paper bags, until a neighbour's wife came in and suggested that they should tie a dish full of fire and smoke to the bag itself.

The brothers did so, and the bag went up and remained longer than ever in the air. Within seven years of its discovery hydrogen was suggested by Dr. Black, the father of English chemistry, as a method of causing light bladders to float in the air, and in the very year in which the Montgolfiers began their smoke experiments a man named Cavallo had sent up soap-bubbles filled with hydrogen. But the Montgolfiers went on using smoke. They made larger paper bags and raised them with little braziers attached.

HOW THE FIRST MEN WERE LIFTED INTO THE AIR BY FIRE

The chief terror of the flying man is fire, but the first man-carrying balloons were raised by fire ! Experiments having been made with paper-lined linen balloons of varying dimensions filled with smoke, Pilâtre de Rozier went up in a Montgolfier balloon in November, 1783, accompanied by the Marquis d'Arlandes. A wicker basket was fixed to the balloon, and a little furnace to supply smoke and heat was attached to the basket. They rose from Paris armed with bundles of wood to feed their fire, and with wet sponges to apply to any flames which might break out in the fabric of the balloon.

There have been few more adventurous voyages than that. The balloon lobbed up and down in the air, threatening to drop into the Seine. The only remedy was to fire up, and that endangered the balloon, which actually was alight in several places. But the journey across Paris was accomplished safely.

THE FRENCHMEN WHO WENT UP IN A THUNDERSTORM

This fantastic bit of gallantry was no sooner achieved than the first balloon to be filled with hydrogen carried up two other Frenchmen a height of 14,000 feet, weathering a thunderstorm and travelling thirty miles. Ascent followed ascent after this, and the public imagination was so fired that plans were soon in progress for building balloons to reach the moon ! Hydrogen now took the place of the furnace in the balloon. The light gas, of which 14 cubic feet lift one pound, was the only possible agent for continuous experiments ; without it ballooning would soon have come to an end. It came to the use of man before the balloon, yet its possibilities as a lifting force was illustrated by a puff of smoke in a paper-maker's house. Ballooning came from smoke ; the aeroplane propeller came from the boomerang.

For over a century balloons shared the sky with the birds, with the decided difference that, while birds fly wherever they will, balloons were always the sport of any wind that blew. They could not be steered. When near the ground their course might be retarded, and in some respects directed, by a long rope with an anchor attached ; but such a rope might drag a man up into the air, whisk a cow off its legs, pull a chimney off a roof, or bring down part of a church steeple.

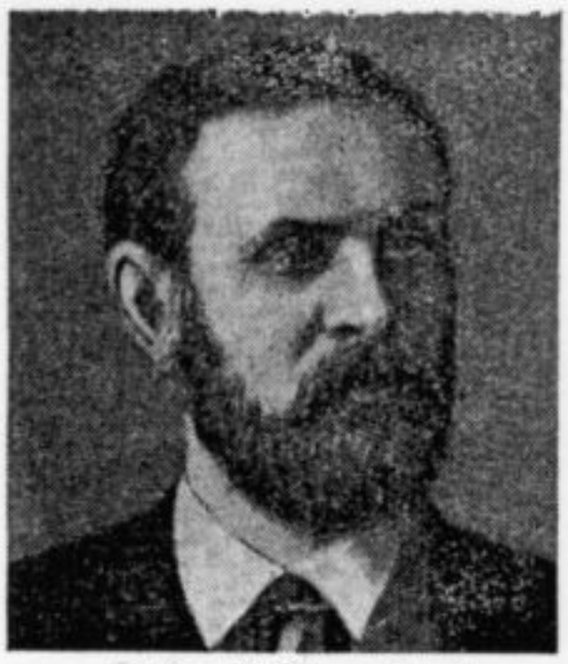
A TERRIBLE ADVENTURE OF TWO MEN UP IN THE CLOUDS

Balloonists did magnificent work in tapping the secrets of the upper air. They revealed the fact that air lies in layers, and that over our heads in what seems an even atmosphere there may be winds one above another ; that while a balloon is sailing serenely in a blue sky from east to west with a low wind, it may meet a terrific thunderstorm coming up on a higher wind from west to east. A great body of knowledge these men accumulated for our flying-engine men ; and they risked their lives and often gave them.

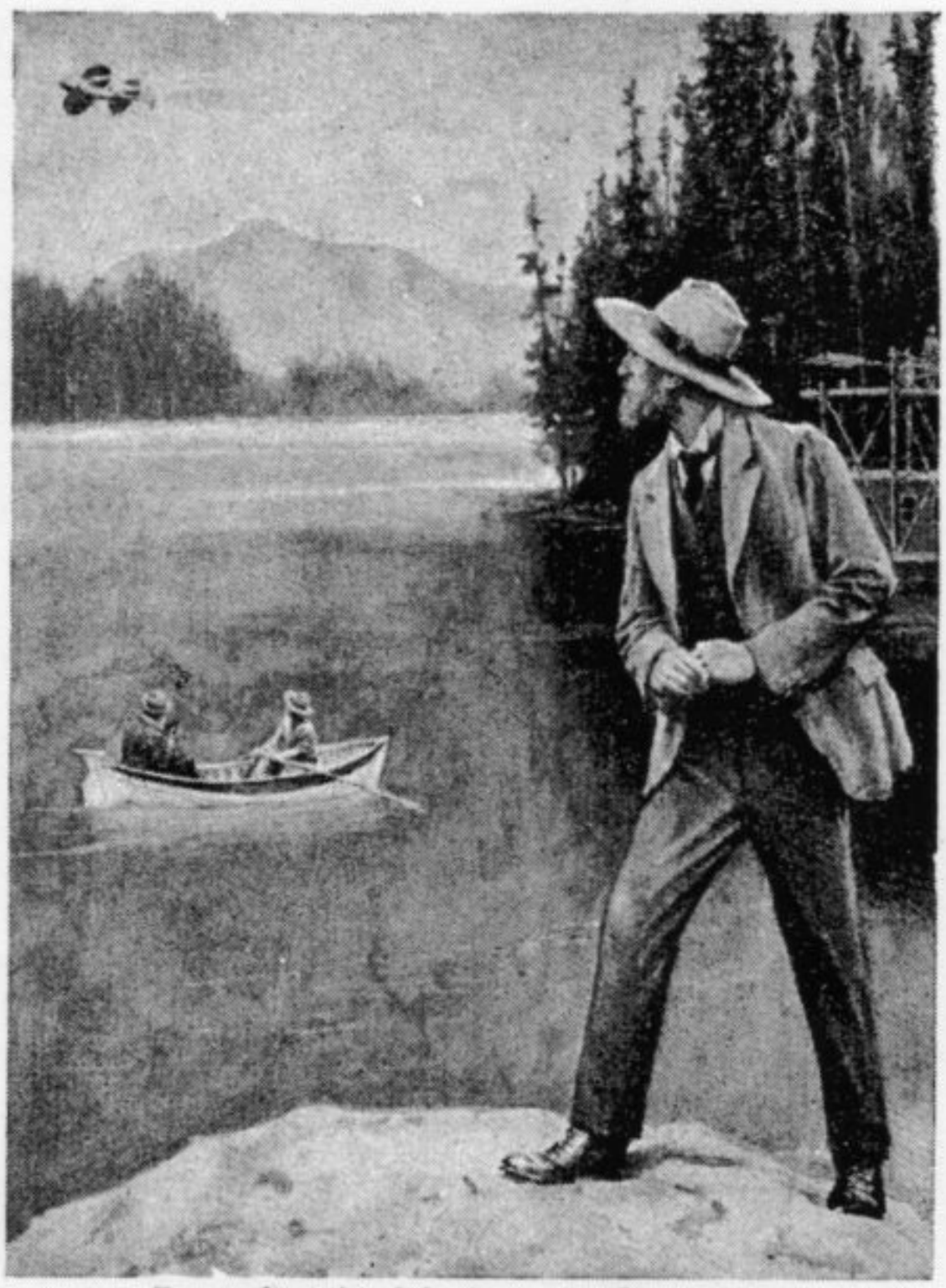
Many magnificent feats of endurance stand to their honour also. The achievement of a scientist named Glaisher and a daring and skilful balloonist named Coxwell has never been forgotten. Before we had ever heard of cylinders of oxygen for the use of airmen at great heights these two splendid fellows, one day in 1862, rose seven miles. They wanted to descend, but the rope connected with the valve was fouled, and Coxwell had to climb into the rigging to clear it. The temperature was below zero, and as Coxwell touched metal his hands were frost-bitten, and his task proved long and difficult. Glaisher found paralysis stealing over him. Power went from his limbs ; his sight failed ; he could barely breathe ; yet his mind remained intensely active till the last. Then he fell unconscious in the car of the balloon.

Coxwell had at last secured the rope he had gone up to disentangle, but when he descended he found that his hands were useless. There was the balloon mounting

STRUGGLING UPWARD THROUGH THE DAWN



Otto Lilienthal



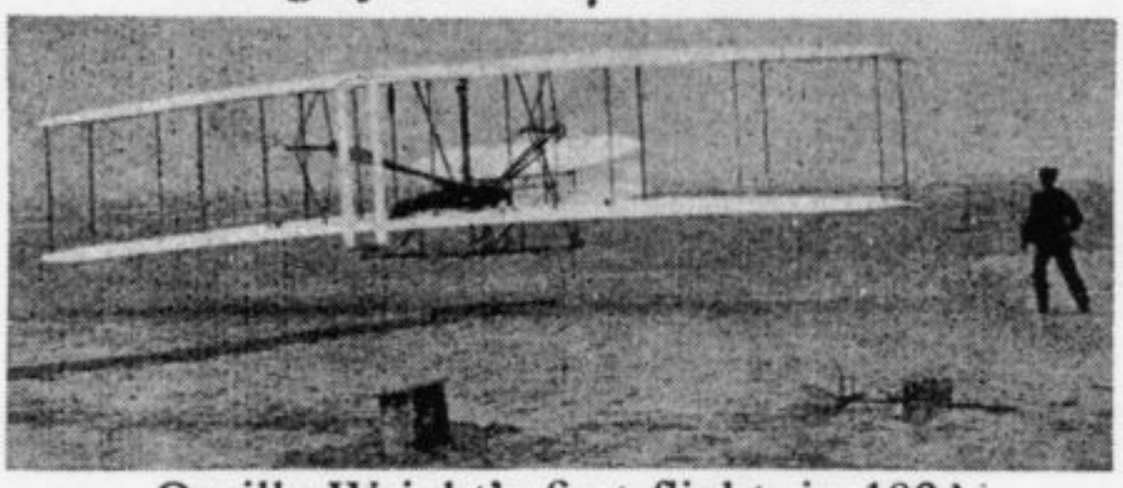
Langley in his hour of success

Santos Dumont

Wilbur Wright

Orville Wright

Percy S. Pilcher

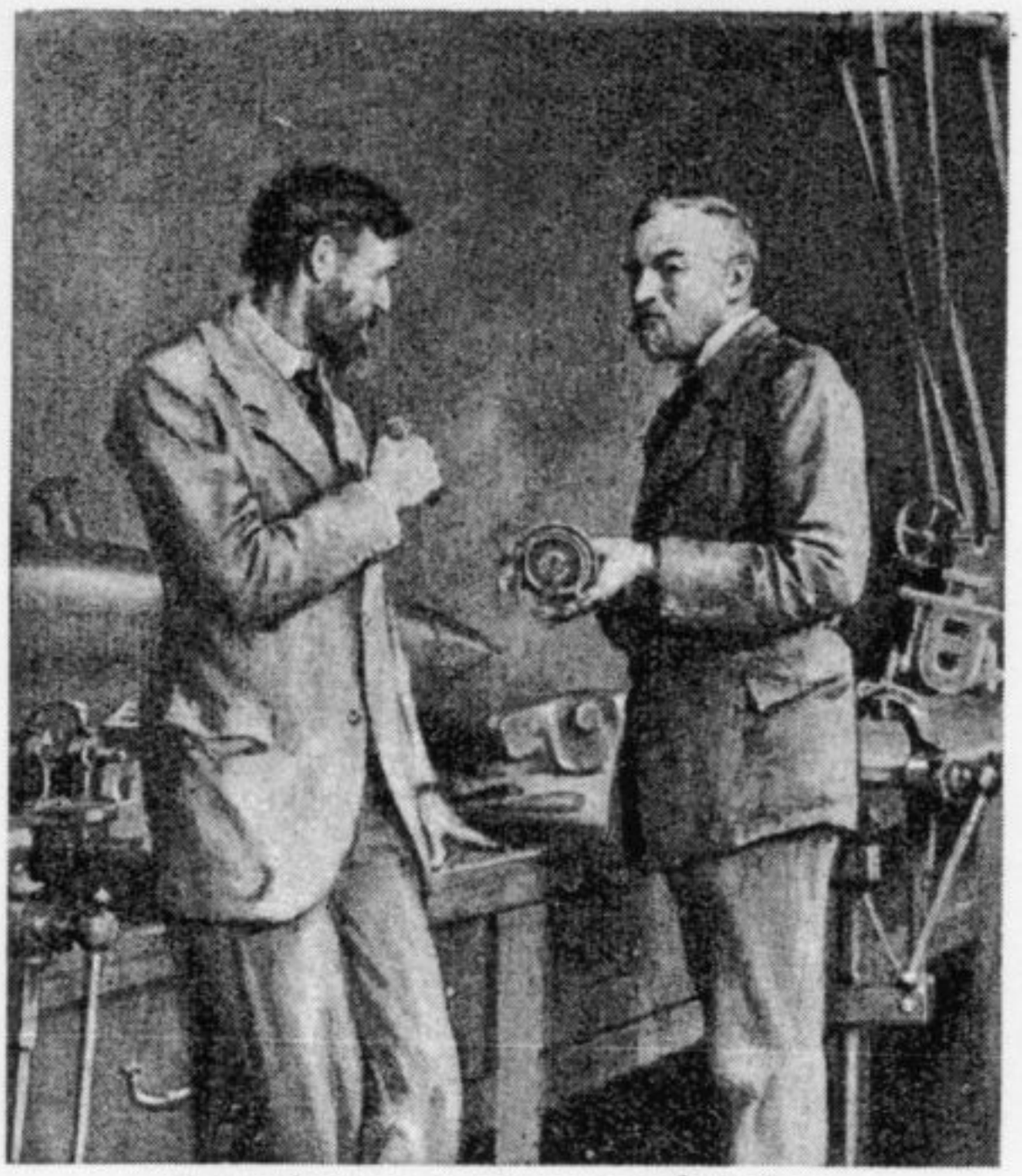


Orville Wright's first flight, in 1903

From a photograph in the Science Museum London.

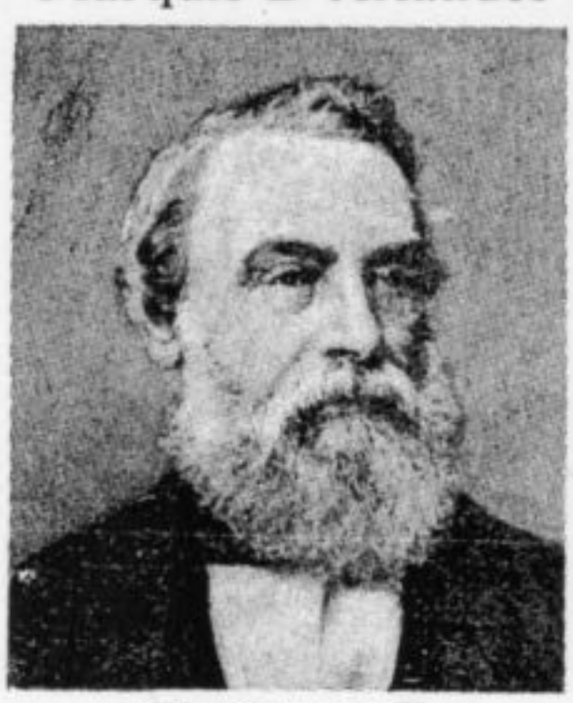
Louis Bleriot

Marquis D'Arlandes

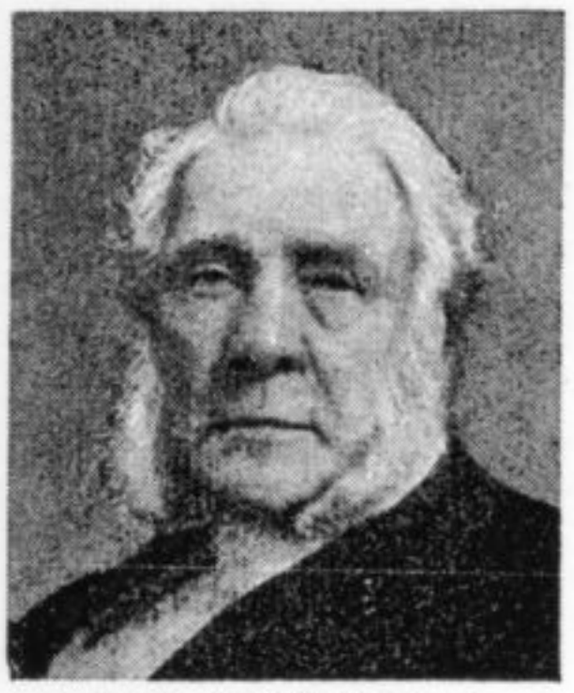


Langley in his hour of defeat

Pilâtre de Rozier



H. Coxwell



James Glaisher

up into the sky and two men near death rising with her, like the phantom crew of the Flying Dutchman. But the immense will-power of Coxwell saved the situation. He gripped the rope between his teeth and tugged and tugged at it with his last gleam of energy. The valve opened; the balloon began to descend; they dropped rapidly into a warmer layer of air. Glaisher recovered, and they were saved. All honour to the men of the balloons! They worked and worried on for generations.

THE ENGLISHMAN WHO MISSED THE FAME OF BEING THE FIRST MAN TO FLY

The next step lay with the men of the motor-engine. Between balloons and aeroplanes came the men who risked their lives by constructing planes and throwing themselves off walls and buildings and cliff-faces, and gliding to earth like the so-called flying animals. A man would begin by launching himself off a bank three feet high and plane across his lawn, and would end by skimming down from a house-top.

It is thrilling to look back and realise how strangely an Englishman missed the fame of being the first man to fly. He was Percy Pilcher, who in the nineties of the last century was experimenting with gliders in a valley in Kent. He had nearly finished making a little four-horsepower engine to fit to his best glider in 1899 when he went to Lord Braye's park at Standford in Northamptonshire to give a demonstration of gliding. He took with him his second-best glider, the Hawk, and, although the weather was bad, he would not disappoint the crowd. When he was about 30 feet up, a rudder wire broke, the Hawk crashed, and he was killed. An Ionic column marks the spot.

THE AMERICAN SCIENTIST WHO INSPIRED THE WRIGHT BROTHERS

Had he lived he might well have beaten the famous American brothers, Wilbur and Orville Wright. For Pilcher, with the Frenchman, Octave Chanute, and the German, Otto Lilienthal, gave much inspiration to those brothers who were destined to solve the problem.

Before the Wrights' triumph, however, a fellow-countryman of theirs came near success. He was the American scientist, Samuel Pierpont Langley, the first of all inventors to make a heavier-than-air machine fly independently—but his was only a model. His dream of making a machine that would carry a man was never realised. But he, too, inspired the Wright brothers, chiefly because he was a scientist who, in spite of the world's ridicule of the idea, believed that men could fly. Langley's plan was in opposition to the mighty authority of Sir Isaac Newton. Many trials showed him that an engine will carry a larger weight at 20 miles an hour than at 10 miles an hour, and a still larger weight at 40 m.p.h. than at 20.

In plain language, the faster you move from place to place in the air the better will be your support from the body of atmosphere beneath the machine.

Numberless were the tests and experiments tried by Professor Langley before at last, on May 6, 1896, he went out with his friend Dr. Graham Bell, the telephone inventor, and launched a model from the top of a house-boat moored on the River Potomac. The first power-driven aeroplane weighed only 25 pounds. It had a wing-span of 13 feet, it was driven by a little steam-engine, and it *flew!* It rose from the house-boat, glided smoothly into the air, sailed above the trees until the steam failed and the propeller ceased to work. Then it planed down into the river, was recovered, dried, and set flying again.

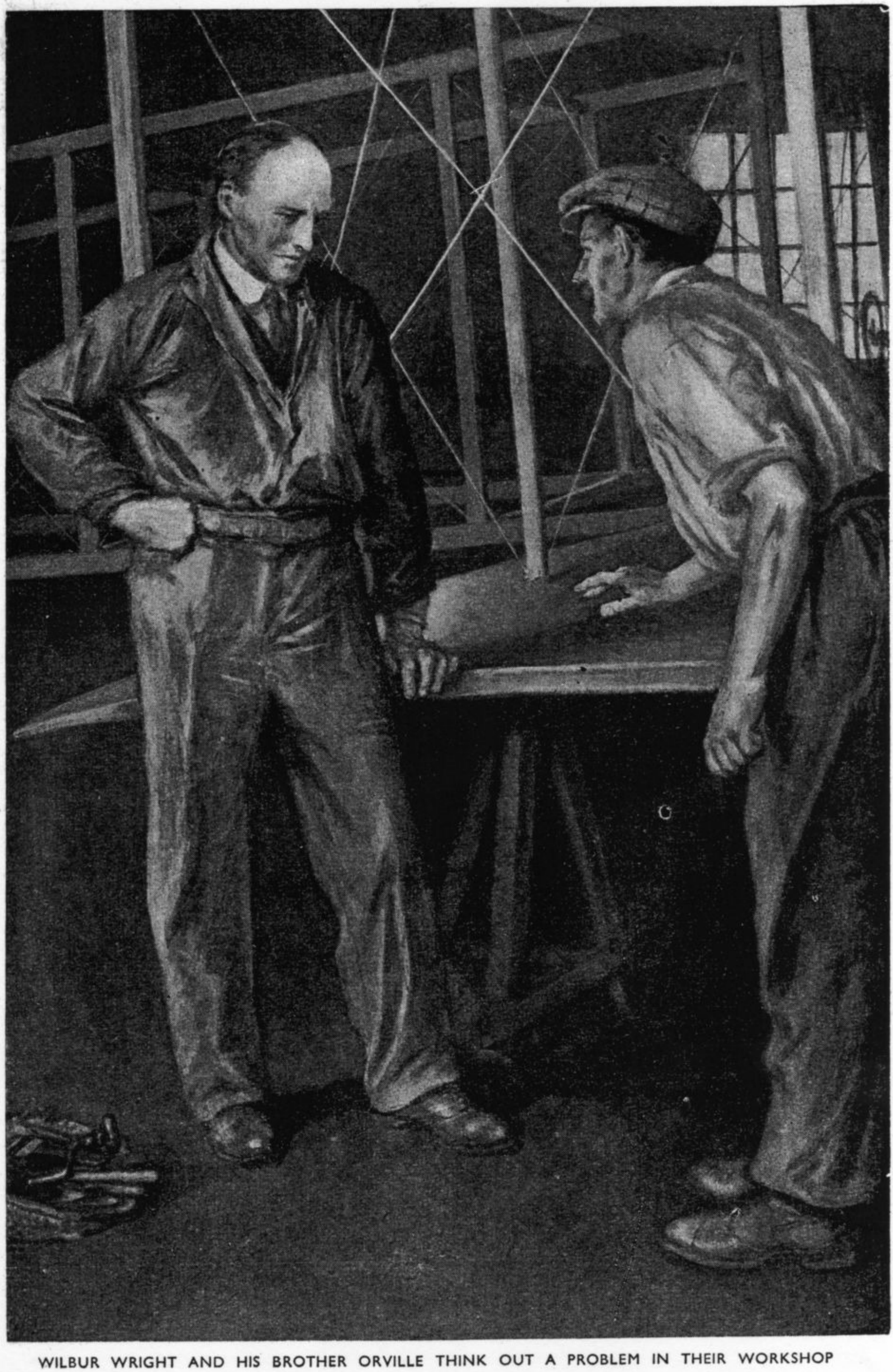
THE MOST DRAMATIC MOMENT IN THE HISTORY OF HUMAN FLIGHT

It was the most dramatic moment in the history of flight, and the inventor was so excited that he could not gaze upon the scene, but withdrew into the woods.

News of this great success was received with mingled rapture and disbelief. To Langley it seemed that his task was ended. He had solved a scientific problem, and it was for the commercial world now to develop the idea if it cared to do so; he wanted no financial gain. There the matter rested for some years, until Langley was persuaded to try a man-carrying aeroplane. He made one in 1903, which, with its engine, weighed 125 pounds. He could think of no better way of launching it than of starting from the roof of the same house-boat as before, and so it was all arranged. But the machine dived straight into the river. It was recovered, and more attempts made to launch it, but each time it fell into the water. Fickle public opinion turned against the hapless inventor, and poured ridicule upon him.

Langley uttered no complaint, but he

WILBUR WRIGHT THINKS IT OUT



WILBUR WRIGHT AND HIS BROTHER ORVILLE THINK OUT A PROBLEM IN THEIR WORKSHOP

went home and said to a friend: "My life's work is a failure."

Only nine days later the Wright brothers made their first flight ! One would think that this would have turned the tables on those who had derided Langley as a crank. But not a bit of it. Strange as it seems to us, it was some years before the world as a whole believed that the Wrights *had* flown.

THE FIRST AEROPLANE AS A CURIOSITY IN THE SMITHSONIAN INSTITUTE

Langley knew it was true, for he was on the best of terms with the Wrights. He died a disappointed man in 1906, leaving his own machine lying as a curiosity in the Smithsonian Institution at Washington, where he had been a professor.

So that it was an American who gave us the first aeroplane; and it was an American who made the first flight. Wilbur Wright, born in Indiana, in 1867, and his brother Orville, born at Dayton in Ohio in 1871, are the actual accomplishers of human flight. Their father was a modest minister; their sister Katherine was a schoolteacher; the two lads were among Nature's nobility. They were eager scholars at school; they set up in business as printers, ... added bicycle-making and bicycle-mending to their calling. It was in 1896, the year in which Langley's model flew, that they took up the study of aircraft. They read all they could read on the subject, made many experiments in their little bicycle shop, and found many theories wrong, inaccurate, even dangerous.

THE ABIDING GLORY OF ORVILLE AND WILBUR WRIGHT

They tried all sorts of gliding mechanism, and Orville once did a glide against an up-current of wind of just over one minute. But they were working towards an engine-driven aeroplane, and with their practical minds they saw that the engine most suited for the work was one of the internal combustion type, driven by petrol, and avoiding the worry and danger of carrying furnace, coal, and water up into the clouds. They went out into the wilds of North Carolina, lived in a hut at Kitty Hawk, and there carried out trials with the tiny motor-engine they had built. They were often hard pressed for money, but their father helped from his shallow purse, and Katherine, their sister, gave every penny she could save from her school earnings. At last they harnessed their plane to the puffing internal combustion engine. On December 17, 1903, one of them flew for 59 seconds !

That was a red-letter day in the history of human progress. Two young men whose friends and neighbours thought them crazy, who tinkered with an invention at the back of their little bicycle shop, were the first human beings to rise from the ground in a heavier-than-air, power-driven machine. They had made it themselves, and had had to teach themselves to fly ! The glory of Wilbur and Orville Wright will shine down the centuries.

Older people can remember when Wilbur Wright came over to Europe and startled them all by flying in France. It is strange now to remember the time when he was tapping away in a shed in the middle of a field in France, preparing the machine which was to astonish all who saw it. All day long the peasants gathered about the mysterious wooden shed, and as the days went by and nothing happened the peasants began to jeer.

THE GREAT DAY WHEN WILBUR WRIGHT WAS UP AMONG THE BIRDS

And then one day the great doors of the wooden house swung open, and out came Wilbur Wright, in grey suit and cap, and out came a great ungainly thing which is very familiar now, but was something to laugh at then—a huge thing of wood and canvas, full of wires, and bars and levers, running along on wheels; and the people laughed more than ever. This was the thing they had waited weeks to see, and as, at last, the machine was run into the middle of the field, the peasants jeered more than ever.

But Wilbur Wright cared nothing at all. He sat down in his seat and got ready.

One ! he shouted.

The crowd jeered.

Two ! he shouted.

The crowd jeered louder.

Three ! he shouted, and the crowd jeered no more, for Wilbur Wright was flying among the birds.

He came down from the skies, never, never to be jeered at again, for these people, belonging to the most emotional race in the world, hailed this hero and kissed him. They had seen the first man fly.

Not many weeks after that the Founder of this Children's Encyclopedia left his desk and went out to see Wilbur Wright

fly at the foot of the Pyrenees, and this is what he wrote home that night:

"Out of this wooden shed—so rough a place for the beginning of the flight of man—came Wilbur Wright.

"There was a sound of whirring wheels; a man was oiling the propellers; Wilbur Wright was moving.

THE KEEN LITTLE MAN IN HIS BIG LEATHER JACKET

"He dragged a clumsy stool across a floor of dust, stepped in among the wires, filled a huge jug with petrol, and climbed up with it on to the stool. He could hardly reach with his great jug—he has not had time to make a pair of steps. But two jugfuls of petrol go into the pipes, and down he comes.

"He goes into his room, and comes out in his black leather jacket. He is going to fly. He goes out of the shed into the field, where is a simple little rail with a pulley arrangement, which he himself puts in order. For a quarter of an hour he moves about, while all the people who are not going to fly wish he would go up; and then the lumbering thing comes out on wheels. Slipping off its wheels, it rests on the rail. The men start the engine by turning the propellers. A dozen people take hold of a rope and pull up the weights that are to give the aeroplane momentum to start. Wilbur Wright sits down on one of the two little slabs of wood with arms like a child's swing. Then—swish!—swish!—he goes along the rail into the middle of a field, and at the end of the rail the man-bird rises in the air.

THE THRILLING SIGHT OF THE MAN-BIRD OVER THE PYRENEES

"Away he flies, on and on, and to see him is the most thrilling thing. The great lumbering thing becomes a thing of grace and beauty. It curves this way and that; it rises high and falls low; it goes straight and spins round; it dips and bends like the wings of a bird; it flies to the hills until it looks in the distance like a motor-car dashing along the snow-covered ridges of the Pyrenees. It flies at the rate of forty miles an hour over the tree-tops until it has gone from sight, and then, after ten minutes, the man-bird comes back, racing a bird that flies beside him, and comes straight over our heads.

"Now we see the man-bird clearly, see him sitting on his seat, his face set stern and straight, knowing nothing of the little crowd below, his eyes fixed ahead, his hand grasping the levers that control the engine and keep him a hundred feet above us.

"The flying machine is alive! No longer is it a great ungainly thing. It moves like the wings of a bird, under the most perfect government of this simple, wonderful man, flying above us and about us for half an hour, and coming down at our feet like—what shall I say to be true? —like a feather on the breeze. Like that exactly. The end of it was amazing beyond belief. This great thing, that had grown beautiful before our eyes, came down from the skies and rested gently on the ground without a tremor or a jolt, with less of that than if it had been a stick thrown up in the street and allowed to fall. It was a thrilling and splendid and historic thing."

WILBUR WRIGHT AND THE INSPIRER OF THE CHILDREN'S ENCYCLOPEDIA

That was the introduction of the aeroplane into Europe; and Wilbur Wright on one of these historic flights carried up with him a portrait of the child who inspired the Children's Encyclopedia.

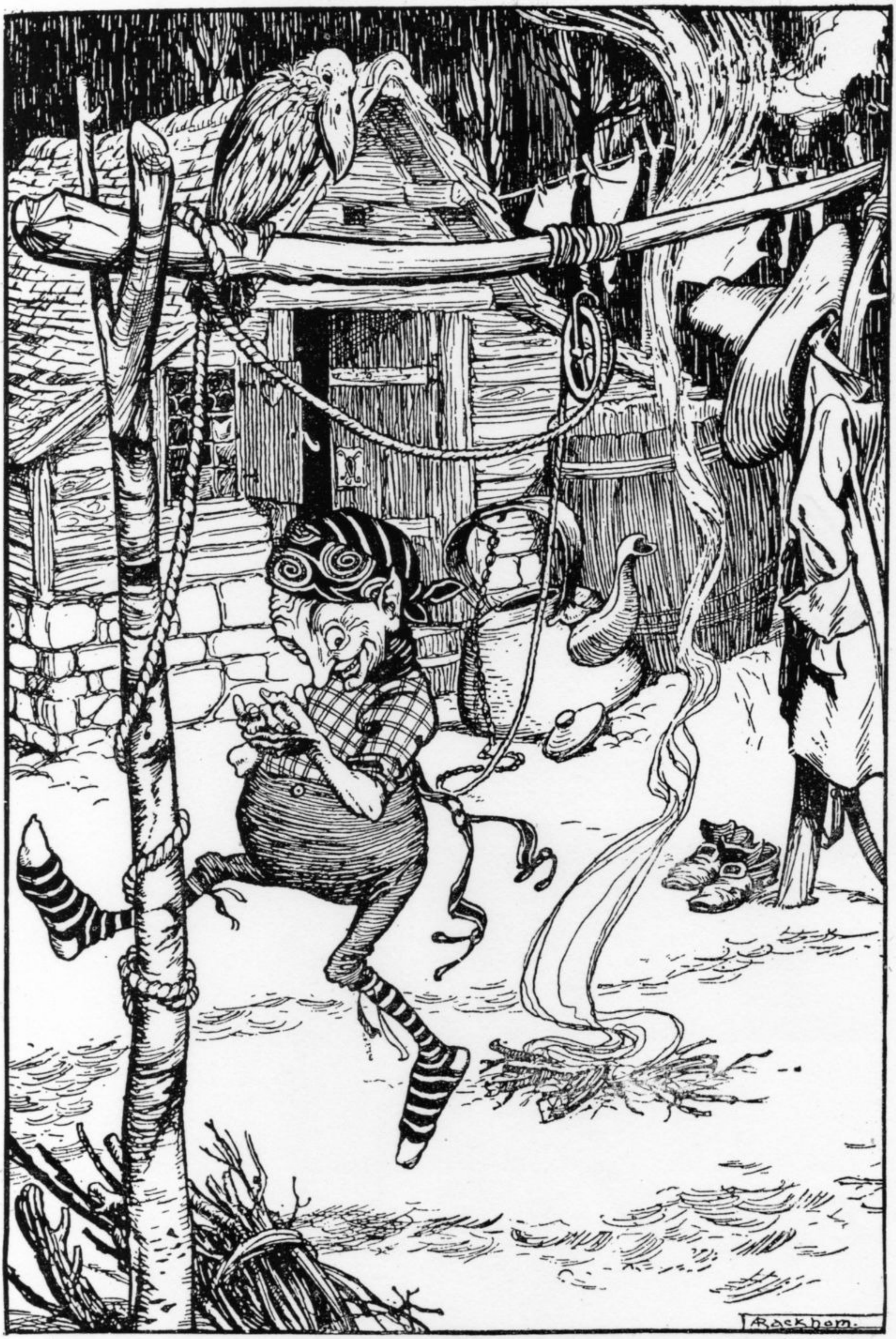
One of Wilbur's many visitors at that period was an Englishman, the Honourable C. S. Rolls who, with Sir F. H. Royce, had already given the world the famous motor car. Charles Rolls in 1910 was the first man to fly across the Channel in both directions in a single flight, the great French pioneer, Louis Blériot, having flown one way in the previous year.

Those were the years when the new art of human flight spread rapidly. C. Grahame-White, in 1909, was the first Englishman to be granted an aviator's certificate. Sir E. Verdon-Roe (described on another page) was the British pioneer in aircraft construction; Henri Farman, the Frenchman, was in 1909 the first airman to fly a circuit of 100 miles.

There was the Brazilian, Santos-Dumont, the airship man who turned to making planes; our own Lord Brabazon, who in 1909 made the first officially observed flight in Britain; Sir Geoffrey de Havilland who, in 1910 built his own plane, and whose son was killed in 1946 while attacking the world speed record in a jet-propelled plane.

There were many others, but the leaders of them all were the two bicycle-shop boys, Wilbur and Orville Wright.

RUM-PEL-STILT-SKIN



ROUND ABOUT THE FIRE DANCED A FUNNY LITTLE MAN UPON ONE LEG, SINGING, "RUM-PEL-STILT-SKIN IS MY NAME." See story on page 30

The Great Stories of the World That Will Be Told for Ever

What These Pages Tell Us

THERE is a kingdom that belongs to us all. Its gates are never closed. Yet no man has seen half the wonderful things this kingdom holds—its enchanted islands, its silvery streams, its magic caves, its mysterious rooms; its giants and fairies and dragons and gnomes ; its marvellous ways down in the sea, under the earth, up in the clouds ; its wondrous colour, its heavenly music, its secrets of happiness that all who will can find. This kingdom is yours and mine ; it is the Kingdom of the Storybook. Here we will walk its streets together and hear the stories children have been told since human life began. We shall read the stories they told in Babylon and Greece and Rome ; the fables and legends and chivalry and golden deeds and fairy tales that have come down to us in books. We shall see the imagination of the world working through all ages, among all peoples.

KING MIDAS

HERE is a story which in olden times the reeds would tell the winds that rush across the surface of the Earth.

One day, when Gordius, the ploughman of Phrygia, came up to the city in a cart, drawn by white bulls, a crowd thronged to him shouting : " The king is dead ! You are to reign over us, for the Oracle has said, *Put on the throne the first man entering the town in a cart drawn by white bulls.*"

The grateful Gordius betook himself to the temple, where he fastened the cart to the altar with such clever knots that no ends could be seen, and the Oracle declared that whoso should untie this knot should conquer Asia. It was not till long after that Alexander, conquering the world, cut the Gordian knot with his sword. But Midas, the son of Gordius, did not care about conquering Asia ; he loved a quiet life and never thought of wars. Yet his quiet country life was soon to be shaken.

One day some shepherds of Phrygia carried to the palace a man they had found wandering in the country, and Midas recognised him as Silenus, the friend of Dionysus. Delighted to befriend him, he entertained him for ten days and nights with an unceasing round of jollity, but on the eleventh day, thinking that Dionysus must sadly miss his friend, King Midas took him back.

Thereupon Dionysus, in his joyfulness at seeing his counsellor once more, offered Midas whatever he wished.

Truly a wonderful chance had come for him had Midas been wise, but the poor king, too greatly excited to think wisely, begged that everything he touched might change into gold ! Dionysus, though lamenting the astonishing choice of his friend, consented, and so it was ordained. King Midas went on his way rejoicing.

At first everything went well with him, and the king could scarcely believe his eyes. If he picked up a twig it became gold in his hands ; if he touched a stone it was transformed ; his very throne was turned to gold as he sat down on it. But, alas, how was King Midas going to live ?

Too late the awful truth began to dawn on him. All the food he carried to his lips, every drink with which he sought to quench his thirst, were solid gold for him ! Even worse was yet to come, for when he kissed his child she changed into a golden statue before his wondering eyes.

Burdened with this terrible affliction, the King of Phrygia strove to get rid of his fearful power ; but all his striving was in vain. At length, in his despair, he implored the god to deliver him from the consequences of his foolish prayer, and Dionysus heard him and yielded. " Go to the River Pactolus," said the god to Midas, " and plunge into the stream."

Midas went, and scarcely had he touched the waters when his power passed to the river, so that the sands have carried gold-dust ever since. From that time, hating wealth and splendour, Midas dwelt in the woods and became a friend of Pan, god of the fields. Often would he take Pan to his palace, and in the king's garden Pan would cut fresh reeds for his famous flute, on which he played tunes so sweet that lambs would follow him, enchanted.

The new happiness that had come to him greatly rejoiced the king, who became a worshipper of Pan ; but, alas, things were to take a tragic turn for Midas.

Apollo making fun of Pan one day, the god of the fields answered with a challenge, saying, " My flute is well worth your lyre " ; and Midas offered his hall for a concert.

On the appointed day a great crowd hastened to the palace. Apollo had invited his nine sisters, the Muses, who came down from the lofty mountains and arrived with Apollo, who rode on the silver wings of his famous horse Pegasus, whose flight was like the lightning flash.

Pan began. He copied the melodious call of the blackbird, the jolly chirping of the sparrow, the thrilling note of the nightingale. Midas loved the song of birds, and, applauding long, he hardly listened to Apollo's play. However, the victory was awarded to the god of the lyre, and all but Midas accepted the judgment.

The anger of Apollo with Midas knew no bounds, and, annoyed that the king's ears should be so depraved, he resolved that they should no longer retain their human form. As Midas mounted his horse on his way back to the palace, Apollo murmured some words of which only the first and last could be heard ; but none paid any attention, and Midas rode away. It was not till he was once more at the palace, with his barber, that he caught sight of his shadow and found that he had ass's ears ! Apollo had avenged himself.

The king vowed his barber to solemn secrecy on pain of losing his own ears ; and a new head-dress for Midas hid his affliction from the people.

Only the barber knew, and well he kept the secret until at last the burden of it was more than he could bear. And so one day the barber ran to a field, dug a hole, lay flat on the ground, and whispered into the hole: " Midas, King Midas, has ass's ears! "

Then, having covered up the hole, the barber went home with a lighter heart, but little guessing what would follow.

In the following year, as he happened to pass by the field, he noticed, waving in the wind, a tuft of reeds, and hardly could our barber believe his ears, for at every touch of the wind the reeds were saying : " Midas, King Midas, has ass's ears ! "

The poor barber fell stricken to the earth, dead. Soon after a child passed by that way and heard the same words on the wind ; and the child repeated them, so that soon the secret of King Midas was known all over the world.

THE THREE LITTLE PIGS

Once upon a time three little pigs went out into the world to seek their fortunes. The first little pig had not gone far before he met a man carrying straw.

" If you please," said the little pig, " will you give me some of that straw to make me a house ? "

" With pleasure," replied the man.

Away went the little pig with the straw and built his house.

Now, an artful old wolf who lived close by determined to have the little pig for supper. So when it became dusk he went up to the little straw house and called out : " Little pig, little pig, may I come in ? "

But the little pig knew his voice, and said : " No, no ; by the hair on my chinny, chin, chin ! "

" Ho, ho ! " cried the wolf. " Then I'll puff and I'll blow till I blow your house in." And he puffed and he blew, and he puffed and he blew, till the house fell down. Then he sprang inside, pounced on the little pig, and gobbled him all up.

The second little pig met a man carrying some sticks.

" If you please," said the little pig, " will you give me some of those sticks to make me a house ? "

" With much pleasure," replied the man.

Away went the little pig with the sticks and built himself a cosy house.

That night the wolf came to the door.

"Little pig, little pig," cried the wolf, "may I come in ?"

"No, no," replied this little pig, "by the hair on my chinny, chin, chin !"

"Ho, ho !" cried the wolf. "Then I'll puff and I'll blow till I blow your house in."

And he puffed and he blew, and he puffed and he blew, till the house fell down. Then he sprang inside, pounced on the little pig, and gobbled him all up.

But the third little pig was exceedingly wide awake the morning *he* set out on his travels. This little pig went on till he saw a man carrying bricks.

"If you please," said the little pig, "will you give me some of those bricks to make me a house ?"

"With pleasure," replied the man.

Away went the little pig with the bricks and built his house.

Soon the old wolf came along that way.

"Little pig, little pig, may I come in ?"

"No, no ; by the hair on my chinny, chin, chin !"

"Then I'll puff and I'll blow till I blow your house in !"

But the house was made of bricks, and the old wolf he puffed and he blew, and still the house stood firm.

The wolf was furious ; but, pretending he did not mind, he said, quite pleasantly :

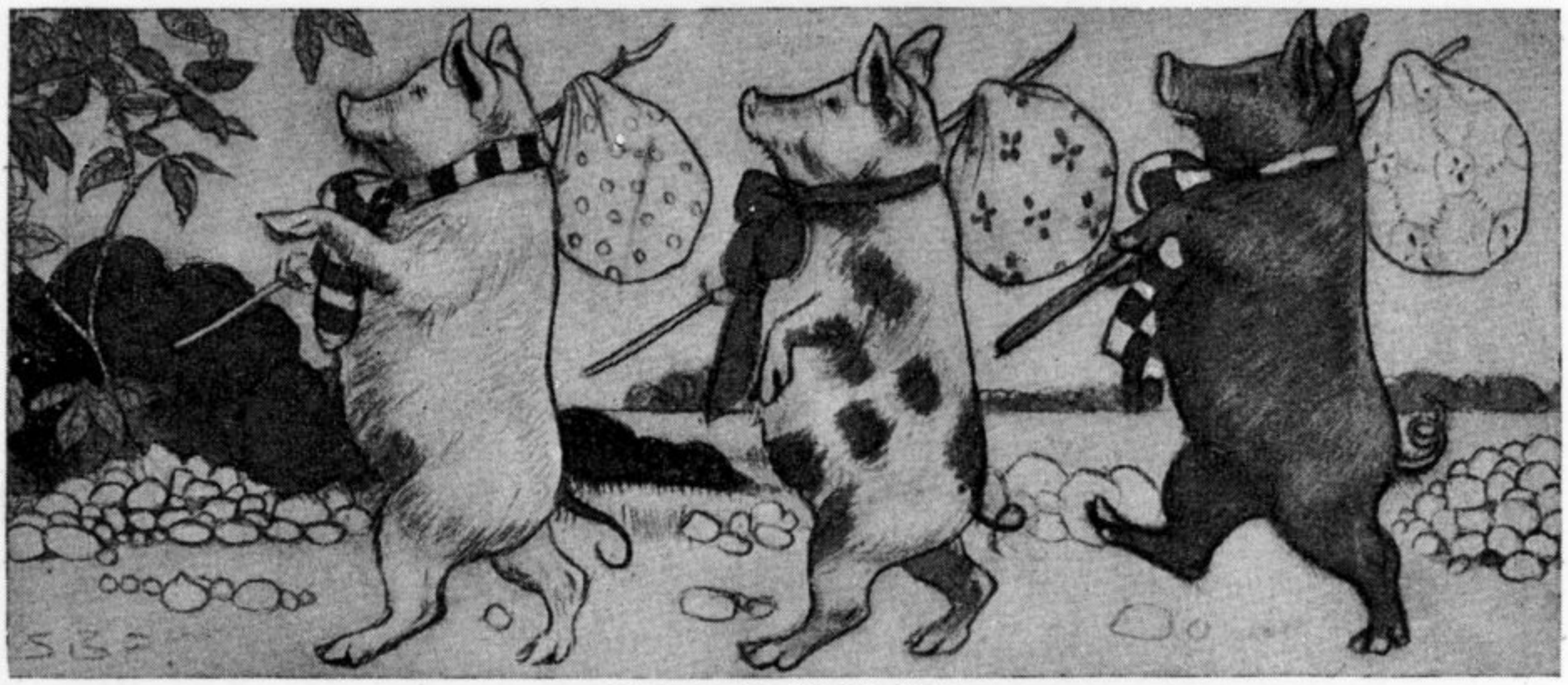
"Do you like apples ? I know an orchard down the lane where the trees are covered with fruit. I'll call for you in the morning, and show you the way."

The next morning the wolf got up very early, and walked round to the little pig's house. But the little pig must have got up earlier still, for when the wolf arrived he found him out. The wolf hurried off to the orchard ; but the little pig saw him coming and climbed up into a tree.

"These are indeed fine apples," he called out, as the wolf came up to it. "Just try this one." And he threw the apple as far away as he could into some long grass. Then, while the wolf was hunting for it, the little pig ran home.

The wolf did not like being beaten, so the next morning he went again to the little pig's house, and said : "There's going to be a fair on the village green this afternoon. You come with me and we'll have a fine time. I'll call for you at three o'clock."

The little pig said nothing, but at half-past two he started off for the fair. He bought a churn, and was rolling it home when he saw the wolf in the distance.



THE THREE LITTLE PIGS

Quick as lightning the little pig jumped into the churn to hide, and set it rolling down the hill. It came flying along at such a speed that the wolf became frightened, and ran home as fast as he could. When he felt braver he went to the little pig's house.

"I was just on my way to call for you this afternoon," he shouted out, "when I met an awful thing rolling down the hill all by itself. It gave me a horrible fright."

The little pig burst out laughing.

"It was I," said he ; "I spied you coming and jumped inside to save my skin."

This so enraged the wolf that he jumped up on to the roof and began sliding down the chimney. But it was baking day, and the little pig had made a huge fire, and that was the end of the old wolf.

RUM-PEL-STILT-SKIN

In a certain kingdom once lived a poor miller who had a very beautiful daughter. She was, moreover, exceedingly shrewd and clever ; and the miller was so proud of her that one day he told the King of the land that his daughter could spin gold out of straw. Now this King was very fond of money, and when he heard the miller's boast he ordered the girl to be brought before him. Then he led her to a chamber where there was a great quantity of straw, gave her a spinning-wheel, and said, "All this must be spun into gold before morning, as you value your life."

It was in vain that the poor maiden declared she could do no such thing : the chamber was locked and she was alone.

She sat down in the corner of the room and began to cry. The door opened, and a droll-looking little man hobbled in, and said, " Good-day to you. What are you weeping for ? "

"Alas ! " answered she, " I must spin this straw into gold, and I know not how."

" What will you give me," said the little man, " to do it for you ? "

" My necklace," replied the maiden.

He took her at her word, and set himself down to the wheel. Round about it went merrily, and before very long the gold was all spun.

When the King came and saw this he was greatly astonished and pleased ; but his heart grew still more greedy, and he shut up the poor miller's daughter again with a fresh task. Then she knew not what to do; but the little man presently opened the door, and said, " What will you give me to do your task ? "

" The ring on my finger," she replied. So her little friend took the ring, and began to work at the wheel, till by the morning all was finished again.

The King was vastly delighted to see all this glittering treasure ; but still he was not satisfied, and took the miller's daughter into a yet larger room, and said, " All this must be spun tonight ; and if you succeed you shall be my Queen."

As soon as she was alone the dwarf came in, and said, " What will you give me to spin gold this third time ? "

" I have nothing left," said she.

" Then promise me," said the little man, " your first little child when you are Queen."

" That may never be," thought the miller's daughter ; but, as she knew no other way to get her task done, she promised him what he asked, and he spun once more the whole heap into gold. The King came in next morning, and, finding all he wanted, married her.

At the birth of her first little child the Queen rejoiced very much, and forgot the little man and her promise ; but one day he came into her chamber and reminded her of it. Then she offered him all the treasures of the kingdom in exchange ; but in vain, till at last her tears softened him, and he said, " If in three days you can tell me my name you shall keep your child."

Now, the Queen lay awake all night, thinking of all the odd names that she had ever heard, and despatched messengers through the land to inquire after new ones. The next day the little man came, and she began with Timothy, Benjamin, Jeremiah, and all the names she could remember, but to each one he said, " That's not my name."

The second day she began with all the comical names she could hear of, Bandy-legs, Hunchback, Crookshanks, and so on ; but the little gentleman still said to every one, " That's not my name."

On the third day came back one of the messengers, and said, " Yesterday, as I was climbing a high hill among the trees of the forest where the fox and the hare bid each other good-night, I saw a little hut, and before the hut burnt a fire, and round about the fire danced a funny little man upon one leg, singing :

Merrily the feast I'll make,
Today I'll brew, tomorrow bake ;
Merrily I'll dance and sing,
For next day will a stranger bring ;
Little does my lady dream
Rum-Pel-Stilt-Skin is my name ! "

Then the Queen jumped for joy ; and as soon as her little visitor came she said :

" Is your name John ? "

" No ! "

" Is it Tom ? "

" No ! "

" Is it Rum-Pel-Stilt-Skin ? "

" Some witch told you that ! " cried the little man, and dashed his right foot in a rage so deep into the floor that he was forced to lay hold of it with both hands to pull it out. Then he made the best of his way off, while everybody laughed at him for having had all his trouble for nothing at all.

THE KING'S NIGHT OF TERROR

THERE was a great multitude in the streets of Palermo, for not only was the morrow a feast day, but the king was expected to go by, on his way to church.

Presently he came, the cold, handsome, haughty, and roystering King Robert of Sicily. Splendidly arrayed, he was surrounded on all sides by a glittering retinue well-nigh as splendid. The evening sun goldened his brown face and made specks of fire in his black beard. There was such a pride in his eye, such a majesty in the carriage of his head, such a masterfulness in his stride, that he seemed like a lord of the human race and emperor of all the world.

The acclaiming shout of the people drowned the ring of the spurred heels, the clatter of the swords, and the gay laughter of the king and his courtiers. In the square before the church the loud huzzas drowned the music of the organ.

The priests were singing the beautiful evening hymn of the Church, Magnificat.

"What do these Latin words mean?" asked the king of a young clerk.

"They mean, sire," came the answer, "He hath put down the mighty from their seat, and hath exalted the humble and meek."

The king frowned. Then, with a bitter laugh he said, "Tis very like sedition. But I tell you this--no person in heaven or on earth can rob me of my throne."

THE JESTER RUSHED UP TO THE POPE

A little later, and the slumbrous words of prayer had sent the king asleep in the shadows of the carven stalls.

He woke. There was darkness on every side. A vast silence held the church. He was there alone.

With an oath, he started from his seat. His scabbarded sword and pointed spurs set strange echoes ringing as he strode down the dark aisle. His heart was on fire with rage and indignation. They had gone—his courtiers and those dogs of priests—and left him in the church alone.

His great hand thundered on the door till the beams groaned and the iron rattled. The sexton came with the lantern.

"Who is there?" he cried.

"The king!"

Shaking his head and placing the key in the lock, the old man muttered to himself, "Some drunken beggar!" Then he opened the door, prepared to speak stern words. A man rushed by as if in madness, and vanished in the dark.

King Robert sped through the darkness to his palace. He gained the banquet hall, which was ablaze with light and cheerful with sounds of merriment. On the threshold he stopped dead, his cheeks blanched, his knees tottering.

Another king—himself in face and form and raiment, yet glorious with some mystic holiness—occupied his throne.

"Who art thou?" demanded this mysterious being, gravely regarding him.

"I! I am the king!" cried Robert,

with a sudden accession of strength and indignation. But as he spoke courtiers and guests leaped up, and, drawing swords, would angrily have killed him.

"Nay!" smiled the mysterious being. "You have made a mistake. You are not the king, but the king's jester. You shall be furnished with cap and bells; you shall have an ape for your companion; you shall lie on stable straw."

And, with the laughter of his people in his ears, the king was borne away to stable straw and cap and bells.

Long he lived as the jester, making sport for all, and buffeted by his own soldiers and servants, companioned in his stall at night by a black ape that watched unmoved his bitter tears.

In vain he cried, "I am the king!" That made the courtiers laugh the more, and made the men-at-arms more scornful with their blows. They flung him scraps of food, and, smiting him with glove or lance, would say, "Long live the king!" and laugh to see the ape creep up beside the jester to share his broken meat.

Thus sadly and despairingly lived King Robert, thought by all to be a madman, till on a certain day the mysterious being on the throne announced a journey to the great city of Rome. Then did King Robert's heart revive. For the Pope was his brother, and at Rome, also, was the Emperor Valmond, likewise his brother. Surely, when he reached Rome with this false king, he would be recognised, and the usurper driven from his throne.

Never was greater pomp and glory seen than in that journey of state from Sicily to Rome. And as the cavalcade passed through sunny Italy, dazzling all eyes that saw it, behind it rolled, like the breaking of a wave, a tide of laughter, merry as a summer's day. For Robert, in his cap and bells, seated upon an ancient piebald steed with broken knees and hanging hair, his ape mounted behind him, and striving to appear a king, made men roar with joy.

But Robert said, "The Pope will know me. Wait till I return."

Up to the Pope, thrusting all men aside, the jester rushed, and, in a voice of thunder, cried, "Look on me! I am Robert, King of Sicily, your brother! This crowned impostor is a liar and a thief! I only am the king!"

The Pope turned from the sorry spectacle. And Emperor Valmond said, "I like not this bad jest—a madman for the jester of a king!"

Strong hands were quickly laid upon Robert, and he was flung into a cell, while the bells tolled for Holy Week.

All through that week he lay neglected and alone. But on the morn of Easter Day, when all the air was filled with clash of bells and hymns of joy, there entered into his cell a presence and a calm which curbed him to his knees.

There, on the floor of his mean cell, dressed in the motley of a clown, King Robert bowed down, placed his hands in prayer, felt the glory of God surrounding his soul, and asked forgiveness of his sins. And all that day he pondered on the meek and lowly Jesus, and meditated on His sorrow and His pain, and thought about Him risen from the earth and placed in glory by God's side.

So when the visit ended, with great humility and lowered gaze, the king returned, and no man laughed to see him pass, and none did smite him with a scornful heel when, with the ape, he meekly sought his stable straw.

But the mysterious being sent for him, and when they were alone he gently asked, "Art thou the king?"

"Thou knowest," answered Robert. "All I know, my sins are scarlet. All I seek, a cloister. I would pray my life away, with thoughts set heavenward."

And as he spoke the music from the chapel came, and the sound of voices:

"He hath put down the mighty from their seat, and hath exalted the humble and meek,"

The mysterious being on the throne became transfigured with a shining light, and like heavenly music was his voice, "I am an angel, and thou the king."

Then Robert slowly, with fear and trembling, raised his gaze, and, lo! the throne was empty, and he stood in that proud chamber all alone, but not in rags, and not in motley, but in the panoply of royal power, splendid and glorious, with all his robes and jewels, and the great crown upon his head.

An hour afterwards the courtiers came to attend the king's commands and take his pleasure. Not on the throne they found him, but meekly kneeling on the floor, in prayer.

DICK WHITTINGTON AND HIS CAT

DICK WHITTINGTON LISTENS TO THE MESSAGE OF BOW BELLS—By James Sant, R.A.

DICK WHITTINGTON was a poor country lad, who, having lost his father and his mother, came to London to make his fortune. His only friend in the world was a cat which he had picked up and fed when it was starving ; and a very good friend it was to him.

Dick used to think that the streets of London were paved with gold, but he found that they were covered with hard stones, and on these stones he had to sleep with his cat for many nights. At last he got a place as a scullery-boy in the house of a rich merchant. Unhappily, the cook was a wicked woman, and she beat him every day and made him sleep in a garret overrun with rats and mice. These, however, were soon killed by Dick's cat, for the cat was an excellent mouser.

The rich merchant in whose kitchen Dick worked was a foreign trader. He used to fill his ships with all kinds of goods, and send them to far countries, where the goods could be sold at a great profit ; and, being a kind man, he allowed all his servants to put in his ships anything that they wished to sell. One day, when he was about to send a ship to trade with the Blackamoors, his pretty daughter Alice came into the scullery and said to Dick :

" Now, what are you going to put in for sale this time ? "

" I've only my cat," said Dick.

" Well, put in your cat," said Alice.

And to please her he parted with the only friend he had in the world.

But Dick soon began to miss his cat. The rats and the mice crept back to his garret and kept him awake at night, and the cook beat him more than ever. So hard did Dick's life become that one morning he tied all his things up into a bundle and set out to walk back to his home.

He got as far as the village of Holloway, and sat down on a stone to rest, and Bow Bells began to chime, and the sound travelled across the fields.

" Turn a-gain, Whitt-ing-ton,
Thrice Lord Mayor of London."

That was what the ding-ding-dong of Bow Bells seemed to say to him. Poor Dick tried to laugh, and began to cry.

But he turned, and went a little way along the road to Finchley.

" Turn a-gain, Whitt-ing-ton,
Thrice Lord Mayor of London."

said Bow Bells, and he turned and went a little way along the road to Enfield.

" Turn a-gain, Whitt-ington,
Thrice Lord Mayor of London,"

said Bow Bells.

" After all," said Dick, " it's only the cook who treats me harshly. How kindly Alice spoke to me ! I will turn again, as the bells say, and see what happens."

Something happened as soon as Dick regained his master's house. The ship in which he had put his cat returned with the news that his cat had been sold at a very great price.

On arriving at the land of the Blackamoors, the captain of the ship went to the king of the country, and was invited to dine at the palace. There he saw an amazing sight. As soon as the dishes were placed on the tables, a vast crowd of rats and mice came and devoured all the food.

" Oh dear ! " cried the King of the Blackamoors. " I shall not get anything to eat again today."

" Good gracious ! " said the captain. " You ought to keep a cat in your palace to kill all these rats and mice."

" A cat ? " said the king. " What's that ? Is it a new kind of lion ? I have bought hundreds of lions and tigers but none of them would kill a mouse for me."

The captain sent a sailor to the ship to get Dick Whittington's cat. When the King of the Blackamoors saw how quickly it killed rat after rat, and mouse after mouse, he clapped his hands and shouted with joy, and said that he would buy it even if it cost him half his kingdom.

" Will you take six sacks of gold for this wonderful little animal ? " he asked.

The captain agreed, and the ship came to London laden with the sacks of gold.

The wicked cook told the merchant that Dick was only a poor scullery-boy, without a friend in the world, and that there was no need to give him the gold. But the merchant was an honest man. He gave Dick all the money, and had him brought up as if he were his own son, and years after Dick married Alice. He was made Lord Mayor of London three times, as Bow Bells had said. Such is the legend that grew up about Dick Whittington, who really was Lord Mayor of London.

LOVE LAUGHS AT LOCKSMITHS

Love laughs at locksmiths. This was the device which the handsome young Marquis of Hautmont engraved on his shield when he came to Paris. Being as bold as he was handsome, he began to make love to Princess Marguerite, the king's daughter, and the king was annoyed at his boldness.

" They are loud words which you have taken for your device," said he, " but are they true ? I will lock the princess up in a tower. If you can enter it within a month, you can marry her. If you fail, you must lose your life."

The marquis pretended to be discomfited. But he secretly ordered some woodcarvers to make a great hollow wooden nightingale. When the bird was finished and painted, the marquis got inside and played beautiful airs on a flute, while his servant drew it about the streets. Everybody began to talk about the mechanical nightingale ; the king came to see it, and Princess Marguerite asked for it to be brought to her. The king, thinking that the music was produced by machinery, had the bird carried into the tower, and the marquis then jumped out and kissed the princess's hand, saying :

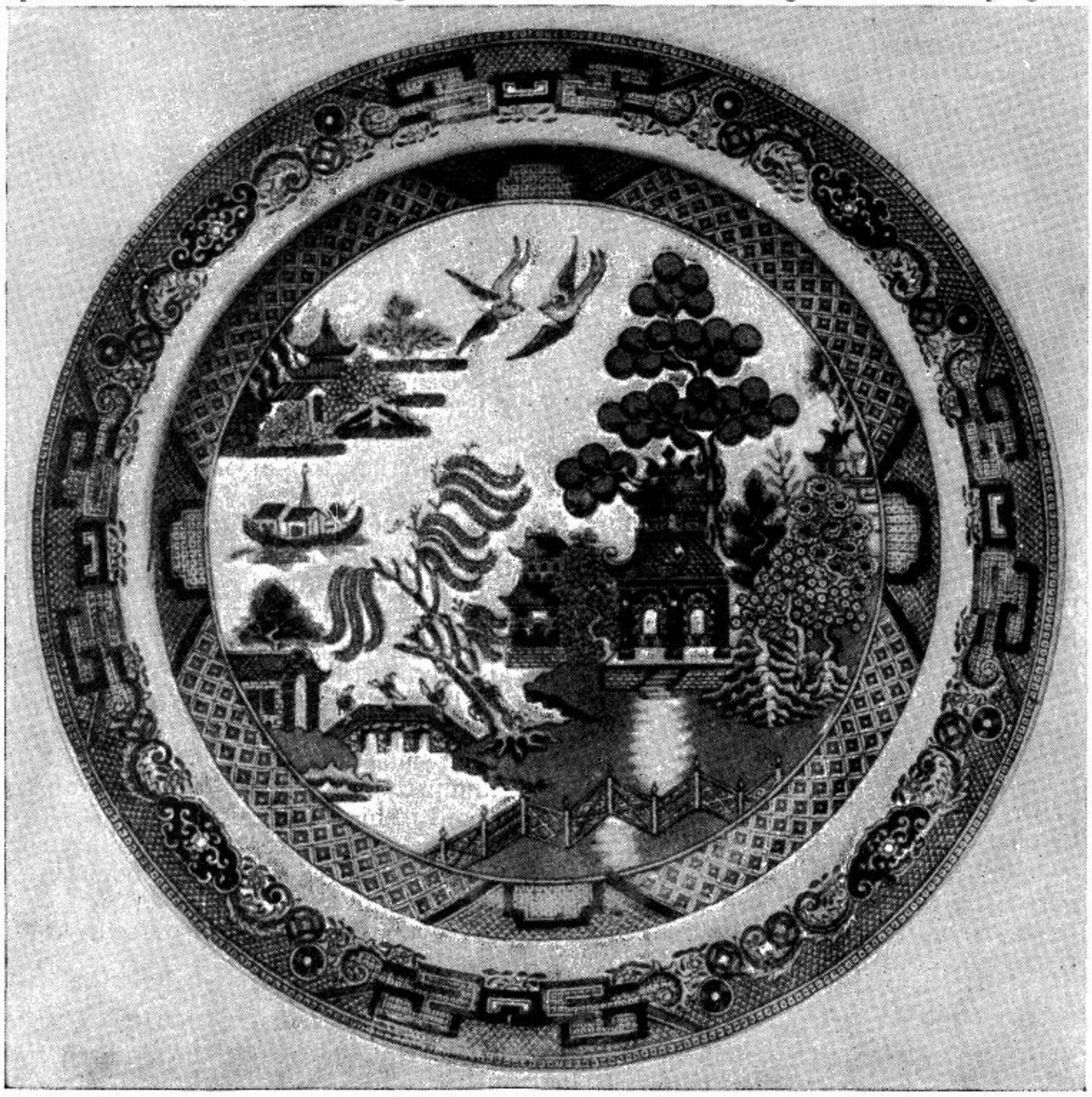
" Love laughs at locksmiths, you see, sire." And the king was forced to acknowledge that this was true ; and as he saw that the marquis and the princess were in love with one another, he allowed them to marry, and presented them with a really royal dowry.

THE WILLOW-PATTERN PLATE

A BEAUTIFUL Chinese girl named Koong-Shee fell in love with her father's secretary, Chang, who was poor. But the father of Koong-Shee wanted her to marry a rich man, and because she could not give up Chang her father sent her away to a little house at the end of the garden. Outside Koong-Shee's window was a willow tree, and just beyond a fruit tree, and Koong-Shee sat all day watching the fruit tree bloom. She was very lonely and unhappy, until one day Chang asked her to fly with him.

Chang dared not post the letter lest it should fall into the hands of Koong-Shee's father, but he found a coconut shell, fixed a sail to it, and, putting his letter inside the shell, dropped it into the lake, and watched it sail across.

Koong-Shee read the letter, and sent back her answer. She said she would go if her lover were brave enough to come and fetch her. Chang went boldly up to the little house and took her away. They had to cross the bridge to get out of the garden, and as they were half-way across Koong-Shee's father saw them, and hurried after them. Koong-Shee went first with her distaff, Chang followed carrying her jewel-box, and behind them ran the father with a whip. But the father did not catch them, and they escaped to a little house on the other side of the lake, where they lived happily. But the rich man who had wanted to marry Koong-Shee was so angry that he set fire to the pretty little house, and Koong-Shee and Chang were seen no more.



Two pigeons flying high,
Chinese vessel sailing by,
Weeping willow hanging o'er,
Bridge with three men, if not four.

JELLYFISH IN SEARCH OF A MONKEY

This is a tale they tell in Japan of the origin of the Jellyfish we find stranded on the beach.

LONG, long ago, instead of soft tentacles, he had a bunch of legs as graceful as a greyhound's, and as for his figure the proudest pig in Ireland could not vie with him for firmly arched, well covered ribs.

Naturally, he was the admiration of all the other fish, for, besides being nimble and stately, he was the only deep-sea thing that could walk on land as well as swim in the water. Unfortunately, he was like only too many human beings, who simply rely on their good looks to make them popular, and do not trouble to develop their brains. This handsome creature was exceedingly stupid.

One day Jellyfish was strolling about the shore of a coral island, when a flying fish shot out of the waves, and told him that he was summoned to the palace of the Dragon King.

As he approached the audience chamber he could hear by the clanking of golden scales that the Dragon King was pacing about in the greatest agitation, but his brow cleared as he caught sight of Jellyfish.

"I thought you would never come!" he cried. "And the Queen gets worse every hour! Listen. The doctors say that she can be cured by swallowing the liver of a live monkey. You are the only fish who can go ashore. You must swim, as you have never swum in your life, to the nearest bit of land, and persuade a monkey to return with you. If you succeed I will make you Grand Warden of the Indian Ocean, with the right to a coronet of pearl shell and cowrie."

Jellyfish hardly stopped to bow; in a very little while he was wading out of the breakers on to a lovely island of palm trees and scarlet hibiscus. The first animal he saw was a small grey monkey with a friendly countenance. Jellyfish hailed him gladly:

"Ho, you Master Monkey there! I am sent by the Dragon King of all the seas; you are to come to his palace."

The monkey's shrivelled face beamed with pleasure. Never had he dreamed of receiving a royal invitation, and he was only too ready to accept this.

For a little while Jellyfish, with the monkey on his back, swam in silence, for he was short of breath, but soon he asked:

"By the way, I hope you have got your liver with you?"

The monkey was not handsome, like Jellyfish, but he kept his wits well polished, and now he grew suspicious.

"Why do you ask?" he inquired.

"Well," said Jellyfish, "the Queen is ill, and she can only be cured by the liver of a live monkey."

At this the monkey exclaimed:

"Dear me! What a thousand pities! I left mine hanging out to air at the top of a coconut palm. We had better go back for the thing at once."

"We must, indeed," said Jellyfish.

No sooner was the monkey up his coconut palm than he called down:

"Go away, stupid! I won't part with my liver for any queen, in the sea or out."

To clinch the argument he threw nuts at Jellyfish till he ran into the sea.

All his knees knocked together as he told the tale of his failure, and the Dragon King smoked with rage. When he had stammered out his last word the monarch roared to his servants:

"Beat him! Beat him within an inch of his life! Break every bone in his body! Beat him to a jelly!"

As you can see for yourself, that is exactly what they did.

HOW A SULTAN FOUND AN HONEST MAN

A SULTAN wanted to find an honest man to collect the taxes of his realm, and a wise counsellor advised him to publish abroad his need, and invite all the applicants to his palace.

"I will show you the honest officer when you ask them to dance," said he.

The applicants arrived, and were told to advance to the Sultan, one at a time, through a dark and empty corridor. As soon as they were all assembled before the throne, the Sultan said: "Gentlemen, I should very much like to see you dance."

But all the applicants refused, with many blushes, except one man, who danced cheerfully and well.

"That is the honest man," said the sage, pointing to the dancer.

In the dark corridor the wise man had placed sacks of money, and all the dishonest men had filled their pockets as they passed through to the Sultan. If they had danced, their pockets would have sounded like money-boxes being shaken, and so they had refused.

Nature's Wonderful Living Family in Earth and Air and Sea

What This Story Tells Us

WHAT a marvellous family is Mother Nature's, with her host of strange and terrible and beautiful children! Some of them have passed away for ever—gigantic creatures of the long ago, tramping the lonely world before Man came. No more will Iguanodon be seen, or Brontosaurus, or old Diplodocus, or the dragons that flew like birds, or the Dodo that lost his power to fly. Gone are they all. Nature has a vaster kingdom now, and smaller. Since life first came ashore her great families have spread throughout the earth. The story of their lives would fill the most romantic book that could be written, and here we will read a few chapters of it. Sometimes the truth will seem too strange to believe, but nothing is more astonishing than truth. The lives of animals, like the lives of men, are far more wonderful than anything the novelist writes about.

NATURE'S THOUSANDS OF CHILDREN

A MARVELLOUS family is Mother Nature's, with thousands of children almost beyond belief. Think of a few of them.

Consider a group comprising a protozoan, an oak tree, a crocodile, a whale, an elephant, and a man. The protozoan is the very simplest form of life, all the mysteries and magic processes of existence wrapped up in a single cell. The crocodile, king of the reptiles; the oak tree, monarch of our forests; the whale, greatest of all existing animals; the elephant, lord of all the beasts that tread the ground; and man himself—each was once a single cell. The protozoan remains one-celled today, the rest develop, multiply cells, cell upon cell, in uncountable profusion. In that rough-and-ready grouping we have the story of the rise of the living families of the world—plant, animal, human.

We cannot any longer make the old sharp division between plants and animals. A sea-lily is like a freakish plant whose stem is chiefly mineral; yet it is an animal. A pitcher plant seems animal in its capture of insects; but it is a plant. The no more intelligent sea anemone, so like a lovely marine blossom, is an animal. An oak tree goes to sleep for the winter as hedgehogs, tortoises, and big bears do. In torrid lands trees and plants go to sleep till rain returns. So does a lung-fish in his exhausted pool; so do the worm and the snail during drought in parched English gardens. Trees shed bark and leaves; shell-fish shed their covering and cast off their limbs; reptiles cast their skins; caterpillars jump out of one skin and grow another. We take cuttings from plants and establish new ones; a starfish rent asunder may become five starfishes, and a worm cut in halves may become two worms.

The resemblance is repeated in the process of reproduction. As trees and flowers produce enormous quantities of fruit and seed, so in animal life we find enormous numbers of eggs. An oyster lays eggs exceeding the population of the British Isles, a ling has a progeny outnumbering the population of our white colonies. Ingenuity excelling human invention is shown by Nature in providing for the dispersal of seeds, as if trees and flowers loved the thought of offspring.

The same astonishing principle exists in the animal world. The eel undertakes an appalling voyage from ditch and pond, far into the deepest recess of a distant

ocean, to bring forth eggs from which will arise little eels that the mother will never see. Birds build wonderful mound nests for eggs which they will not hatch ; wasps construct nurseries and store rich larders for baby wasps which will come to life when their parents are dead. Fishes strew the sea with ova and never see their children.

Purpose and result are the same with trees and with animals. That parents shall leave one or two children to succeed them and to maintain the species—that is the lot assigned them, and all the fruitfulness, all the splendours, beauties, and harmonies of existence are means to that end.

LIFE IS MADE UP OF BEAUTY AND SPLENDOUR AND TERROR

That unseen mighty Hand which painted the flowers painted also the butterflies, gave them lustrous scales to make them equally lovely, gave them, also, their own apparatus for the creation of rich perfume to render them attractive to their fellows. All the colours of the rainbow are in the flowers, but they are repeated in the insects and again in the birds. Reptiles have many rich, strange hues ; there is luxuriant colouring for many of the mammals ; and, as if Nature has an eye to farce as well as to harmony, we find most extravagant colours on the bodies of apes.

Life is made up of beauty, splendour, wonder, skill, cunning, and also of terrors we can dimly understand. To balance the song of the nightingale and the rich loveliness of a humming-bird we have the terrible deeds of the flesh-eating animals.

Every day and night myriads of herb-eating creatures must die to make meals for the carnivores. Every day, while the bee is performing her beneficent wonders in the hive, multitudes of insects are sentenced to lingering death by ichneumon flies, which make nurseries of them for their eggs, from which will hatch ichneumon grubs to devour the living bodies of the insects in which the eggs are laid ; and wasps carry living spiders to their nests, paralysed but not killed, to await, alive, the birth and appetite of the grubs yet to be born from the wasp's eggs.

HAS NATURE REACHED HER HEIGHT OR IS SHE IN THE CRADLE?

These are facts to be considered as much as the vivid luxuriance of the flowers and the harmony of the song of birds. On the face of it the scheme seems desperately cruel ; but Nature is wiser than the wisest of us. Her ways may be terrible only in appearance, not in reality. She may have her drugs which dispel the fears and soothe to sleep the senses of her victims. It is comforting to assume that. But it should make us determined not to add one pang of suffering to the inevitable total, and to prevent pain and anguish wherever we have dominion in the animal world.

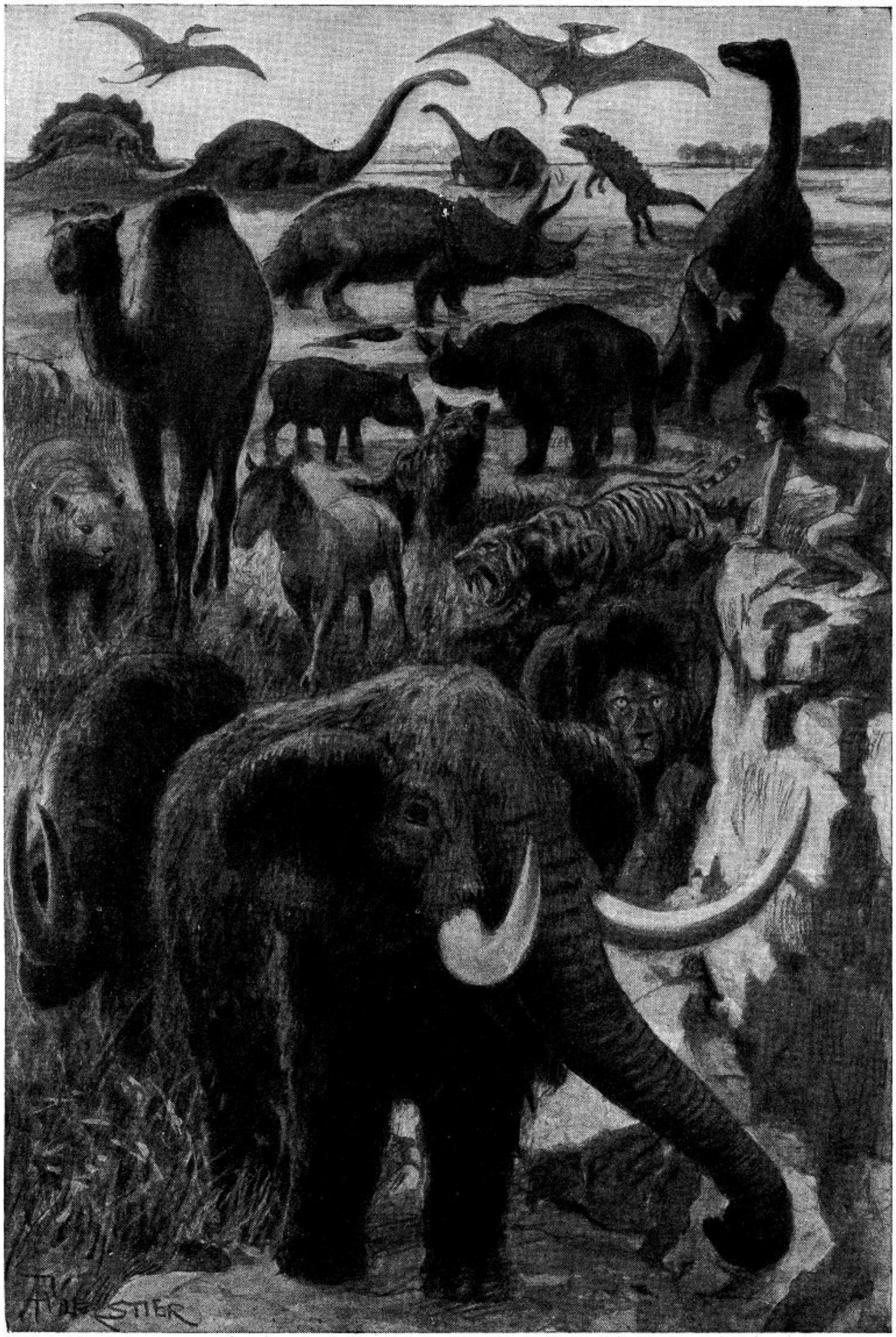
For Nature will not alter. She never does. She is as ruthless as she is benevolent. She cherishes success, she tramples down failure—not suddenly, not in a century, not in an age, but slowly and surely. The things living today are her successes, though some of them—the great apes, the sloths, the giant reptiles—are failing fast, while others are improving. We do not know whether existing creation has reached its pinnacle, or whether it is only in the cradle. If man is too successful as an agent of destruction the answer may be that the bulk of wild creation is neither in the cradle nor at the summit, but on the brink of the grave. But until man rose to pre-eminence Nature pursued an even course of development, progress, trial, failure, renunciation, triumph.

THE WONDERFUL THINGS NATURE BUILT WITH HER BOX OF BRICKS

She has filled the Earth, the air, the waters, with abounding forms of life. All arose from creatures as simple as the one-celled animals of our waters. From those lowly creatures, during unthinkable periods of time, came all life. No changes effected in the crucible of the scientist match the marvels wrought in Nature's processes. She had all time and all substance for her work. The one group of elements sufficed for all the diverse outlines and characteristics known in the Book of Life. Our oak, crocodile, whale, elephant, man—all are made up of precisely the same elements, differently grouped and arranged. A boy with a box of bricks builds first a cottage and then a castle. Nature, with her box of bricks, built man and mouse and mammoth, reptile and bird and insect, at different times and from different starting-points.

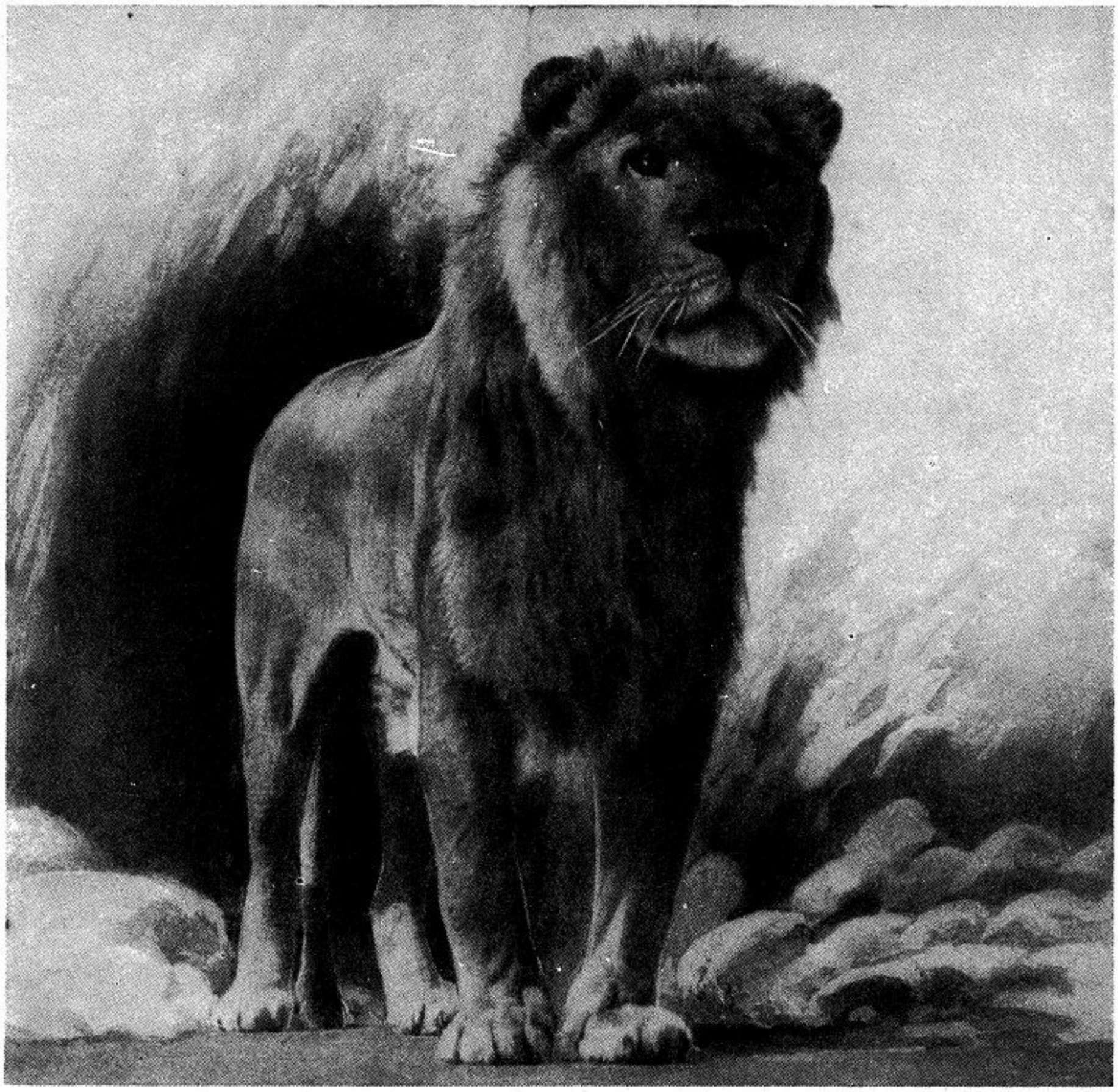
In the waters of a twilight world were the first of created life forms, mere specks of living jelly. From these substances Nature evolved a succession of creatures new and strange. She changed a creature a little and changed its children more, and the changes became constant, as the changes which man effects in flowers.

THE AMAZING PROCESSION THROUGH TIME

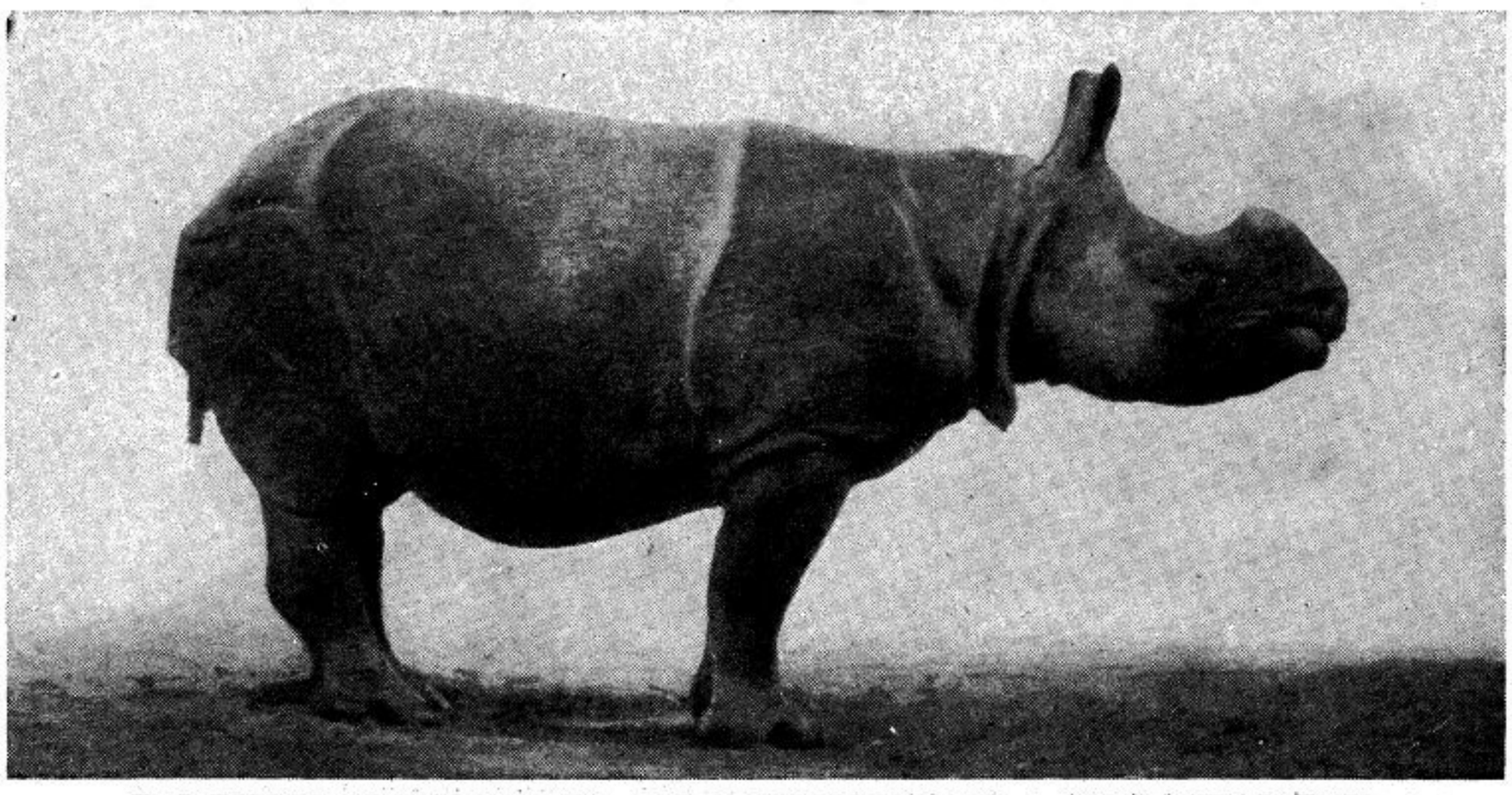


Here our artist imagines a man with the power to look down Time and see the gigantic creatures that inhabited the world before man. If we study this picture by the Clock of Life on page 10 these creatures, going down the page, would begin to appear about 9 and go on appearing till about half-past 11.

PROWLING BEASTS OF SWAMP AND JUNGLE

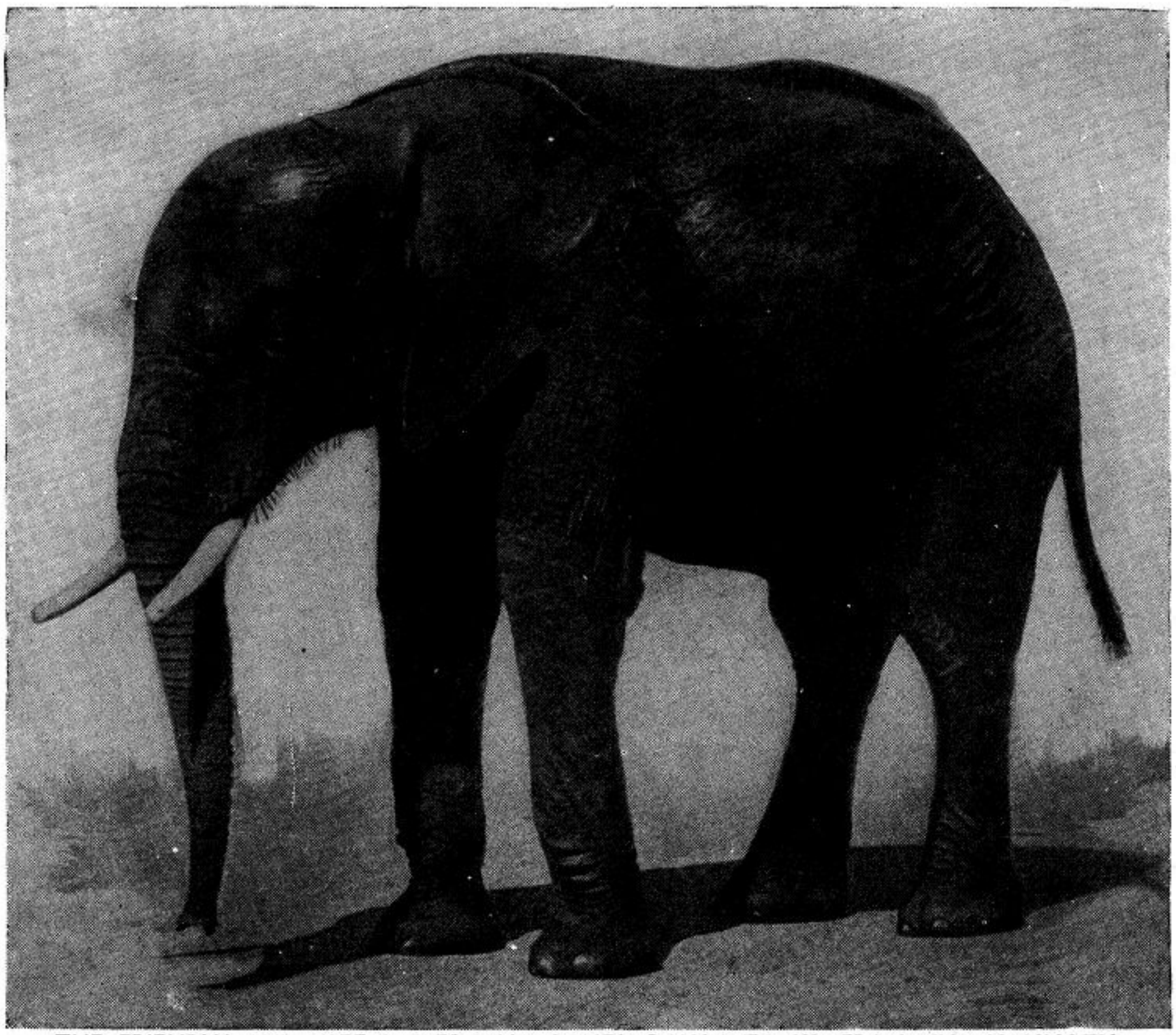


THE LION, MOST TERRIBLE MEMBER OF THE BIG CAT FAMILY AND LORD OF THE ANIMAL WORLD



THE TERROR OF THE SWAMPS—THE RHINOCEROS WITH A COAT LIKE LEATHER

DESCENDANTS OF ANCIENT MONSTERS



THE FRIENDLY AND USEFUL ELEPHANT COMES DOWN TO US FROM THE MAMMOTH

THE QUEER ANT-BEAR COMES DOWN TO US FROM THE GIANT SLOTH

birds, and animals by scientific breeding are constant. Jelly-fish arose, and to protect them from creatures which would have devoured them Nature gave them stings. Worms were formed, in infinite variety, and from them came insects and the sea-urchins, brittle-stars, and so on.

Then along another line came the Crustaceans, first of all Nature's little men in armour; then the things with shells such as we recognise in the molluscs and gasteropods; and, as shell-design became a fixed feature of life, the way was open for the cuttlefish to take his place in the increasing army.

We are sketching very rapidly only the imaginary line of ascent, so that a thousand details are omitted. Let us hasten to the first attempt at a backbone.

Nature seems to have toyed with this idea in several forms. Two of her experiments are with us today. The lancelets and the tunicates of modern times never are, but always seem likely to be, blessed with backbones. Each young one seems about to grow one, but the promise is never realised, and the adult is grouped like its ancestors, with the backboneless. There they are today to suggest what all creation might have been like had not Nature succeeded at last in finding a line of life fit to bear spine and ribs.

THE BACKBONE COMES AND ALL THINGS ARE POSSIBLE

Lancelet and tunicate, deprived of the backbone, never got any farther forward, and thousands of other failures of which we have no record must have passed out of knowledge. But at last fishes came, strong, pliant, bold; the order of Vertebrates had come into the world, and all things were possible!

Fishes multiplied in number and species, and, the idea of armour having taken root on the bodies of crustaceans and molluscs, the fish must have their armour too. And arm they did, in mail of bony plates, invulnerable to any teeth then in existence. Nearly all fish took to armour for ages, and the sturgeon and half a dozen other floating fortresses survive to remind us of what they were. Things were developing apace in the waters as each successful feature established itself, and fishes gradually grouped themselves in an ascending scale of power and merit. But the greatest adventure had yet to come. Life had to cease swimming and march! It had to come ashore.

To do so gills, which breathe water, had to yield place to lungs, which breathe air. What a revolution this represents we may infer from what would happen if men tried to convert themselves now from air-breathers into water-breathers, and to forsake the land for the sea. Life had to make the hazard in those old days, and insects and vertebrates came trembling ashore, to be left high and dry when the tide ebbed, to be re-covered when the tide flowed again, and finally, after millions of years, to come right inland and possess the Earth.

ONE OF THE MOST DRAMATIC EPOCHS IN THE STORY OF NATURE

That was one of the most dramatic epochs in the story of animate nature. It was the beginning of a pageant whose source was the waters and whose summit was mankind—a sea-squirt at one end of the line and Shakespeare at the other.

Once life had landed it made fast, and the developments which had begun in the deep were multiplied on Earth. The great forms were amphibian—frogs, toads, and salamanders, things which were born in the water and came ashore to live.

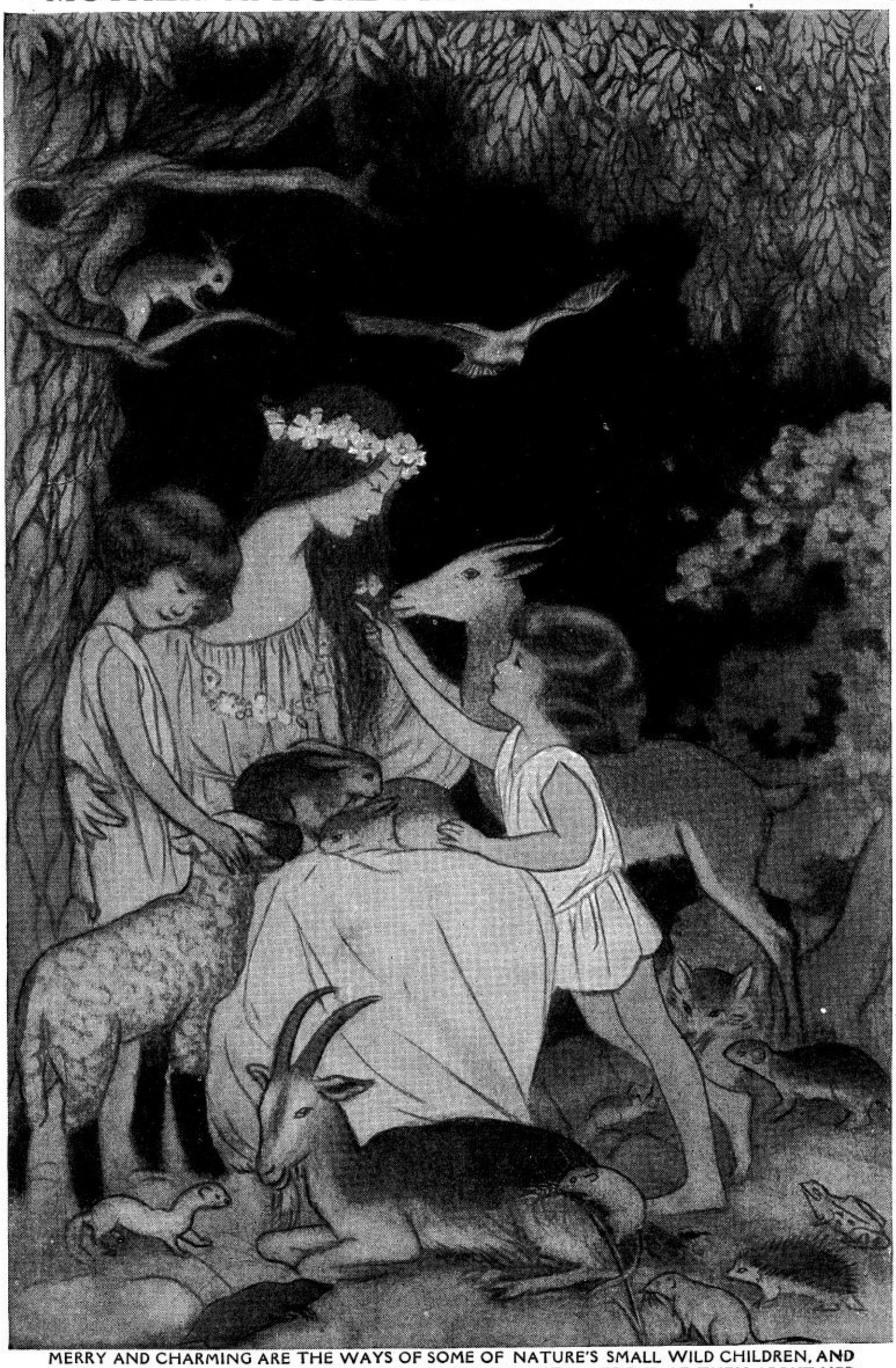
The early amphibians grew gigantic, some of them as big as oxen, but the reptiles, creatures born on land, were the next to advance. They also attained colossal size, but, though they possessed the Earth and ruled in horror, the future did not lie with them, for there was not a brain worthy of the name among them.

Forth from one of the reptile groups came the ancestors of the birds—not at a bound, of course. The reptiles themselves took to the air in numbers, huge, loathsome-looking things with leathery wings, the real dragons, though they did not breathe fire, as the legends say.

THE MOST TERRIBLE AGE OUR EARTH HAS SEEN

The age of reptiles was the most appalling, we must suppose, that ever Old Earth has witnessed. The sea was turbulent with the movements of the colossal swimming fish-lizard called ichthyosaurus. The marshy land trembled and squelched beneath the tread of giant dinosaurs, which, squatting on their haunches, pulled down the tops of trees to feed. Carnivorous monsters devoured herb-eating dinosaurs; the nightmare creature called stegosaurus roamed about with its immense bulk and length, armed with great bosses of bone along the back.

MOTHER NATURE AND HER LITTLE ONES



MERRY AND CHARMING ARE THE WAYS OF SOME OF NATURE'S SMALL WILD CHILDREN, AND HERE MISS PEARSE HAS PICTURED MOTHER NATURE WITH A GROUP OF THEM ABOUT HER

The incredible brontosaurus, the terrific iguanodons, creatures of the lizard order, were there, and in the air were the pterodactyls, flying reptiles with teeth as terrible as a crocodile's. These were the masters of that amazing world.

The birds began pretty much where the pterodactyls left off, for the archaeopteryx, first of birds, was lizard-like in body, in tail, teeth, and jaws. Its tail was long and jointed, but feathers grew from each joint. Here, in feathers, a new structure had come into being, and we must believe that blood—cold in reptiles, amphibians, and fishes—had at last become raised in temperature. Birds were the first things not clad in scales or armour, and they were the first to possess hot blood. Birds had come and were left to blossom into bulk, beauty, and a thousand forms, hues, songs, and habits. The giant moa tells us by his remains what they did with their genius for mere size; the extinct dodo, the ostriches, and the penguins reveal to us how fatally some misused their sovereign gift of flight.

AT LAST THE HOUR SOUNDS FOR THE GREAT DAWN

At last the hour sounded for the dawn of mammal life, of life for creatures that have hair or fur, warm blood, and, the highest characteristic of all, the habit of nurturing their young on milk. They came from a reptile origin. Man bears the seal upon his body of far-away ancestors who were reptiles, and of still earlier ancestors who were fishes. The first mammals were little timid animals, and how they kept their helpless young alive in such a world of perils passes understanding. But they did it by the exercise of a new quality.

Something which made the Earth worth while appeared. It was love, mercy, the spirit of self-sacrifice; the sublime power which makes us ready to lay down our lives for others. That was the condition which changed the face of Nature when mammals came into being. It did not happen forthwith, but the mere fact that mammals survived the early days of danger in that reptile-ridden Earth tells us that love for offspring was triumphant. The doom of brute frightfulness arrived when animal love conquered peril.

NATURE HAS STOPPED HER GIANTS AND METHUSELAHS

The same varying development which we see among fishes and reptiles took place among mammals. Armour and size were the order for the reptiles, size and weapons for the mammals; that was the plan for most. Herb-eaters grew gigantic. The flesh-eaters grew huge, too; bears bigger than any now existing, tigers immense and strong with tusks like sabres, lions of appalling size and power.

There is nothing tending to increase of bulk to which Nature has not given rein. Every order existing today has had its giant in the past Nature, though she explored possibilities with every order, though she sent the whale and walrus back from the land and let them grow monstrous in the sea, has ceased her strivings for giants and Methuselahs. No more does she produce enormous trees which last thousands of years, or dinosaurs that live two centuries. She creates more trees, but gives them shorter lives. She summons into existence more animals, but gives them a briefer span.

All the giant reptiles are gone, all the giant mammals save the whale, elephant, rhinoceros, and hippopotamus; all the myriads of armoured fish have vanished save seven groups. Birds have lost their reptile teeth and gained a thousand graces. Mammals have increased their speed and cunning and lost inches and weight; man himself has lost his hairy body-covering, his gloomy brow and mighty canine teeth. Much has gone of the animal world which the reptiles knew. Its secrets have now to be sought in the rocks formed from the age-old mud into which past forms sank to die.

MAN THE LORD OF ALL, WITH HIS WONDROUS POWERS

The best and highest yet remain to proclaim the wondrous story. The past is full of nightmare terror and phantasy, interpreted by creatures turned to fossils underneath our feet. Now comes Nature's highest yet—Man, the lord of all, the only creature to whom a soul is given, in whom the brain has become the master organ of the body. Though he rises from the same ancestral stock which produced apes and monkeys and lemurs, he is the supreme achievement of Nature; and, having made him master of her kingdom, its animals, its resources, and many of its secrets, it would seem as if Nature means him to act the rôle of Viceroy of the Earth, and himself to mould the forces which, until his coming, were wielded by Nature herself.

And what will Man do with his powers? His conduct in the discharge of his trust will determine whether the animal world generally is in its cradle, or is approaching a destiny which is to be a tomb.

The March of Man from the Age of Barbarism to the League of Nations

What This Story Tells Us

WE do not know how long it is since some trembling human creature hid himself from some wild beast that threatened to engulf him, but we know this trembling man is now master of the Earth. How he rose from the mists of time, by what struggles he survived, how he overcame his enemies, how he set up kings and threw them down again, how he found fire and what he did with it, how he magnified the senses Nature gave him and won new powers from Nature's secret stores, how he made the world a better place to live in and filled it with beauty and power and music and books—this is a tale indeed ! Here we shall look at the great epochs of man's march from the days he came into the world, through the long years of his struggling and yearning, up to these days when, if only he will open his eyes to see, he stands at the gate of the Promised Land.

MAN SETS OUT ON A JOURNEY

EVERY story in the world has grown out of the story we are going to read. Every picture in the world has grown out of the picture we are going to unfold. And every discovery that has been made by the inventors and the men of science since life began has come from the discovery unveiled in this journey we now set out to take together.

For we are setting out to follow the rise, the growth, and the adventures of the very greatest thing on this planet, the thing which stood up in the midst of barbarism and chose a road which led to civilisation, which found itself shut in on every side by Ignorance and broke a way through to Knowledge, which was so feeble that any beast of the field might have stamped it out of existence, yet which discovered in itself the secret of all power and dominion.

We are going to consider the wonderful journey of Man through Time.

Many thousands of years after the flames which wrapped the whole Earth had blown away, many thousands of years after the steaming vapour which clouded it all round had lifted into the sky, and many thousands of years after Life in myriad forms had appeared on its surface,

JULIUS CAESAR

there came into existence a creature different from every other creature under the shining Sun.

Millions of years had gone to the making of this astonishing creature.

A period of time, so tremendous that we may call it almost an eternity, had passed over this beautiful and mysterious Earth before there came into the world of life a creature radically different from all the other inhabitants of Earth, yet so like some of them that from an outside view it might have been confounded with them.

The difference was invisible. The thing which separated it from all other living forms was inward and spiritual. This creature had a Mind, and this mind was the most wonderful thing existing in the world.

Man stood in the dense primeval forest, and looked about him with eyes which seemed no different from the eyes of apes and tigers, elephants and birds, snakes and bear ; but behind those eyes of his was a mind which reflected on what he saw. All the rest of creation *looked ;* he alone *observed*. Something within him could not rest content with the instincts he had inherited, like the rest of creation, from

millions of years of experience. He felt within himself a power which urged him into strange ways; a restlessness, a disquiet, a curiosity, a faint and struggling faith in himself which crossed his instincts at every step. He had no name for this movement in himself, just as he had no name for bear or tiger; all he knew, dimly and confusedly, was that something pushed him from within into new paths.

This is what happened. The energy which had been working in matter for millions of years, which had brought into existence during those tremendous periods an infinity of living shapes, was now working in the brain of man. The great process of Evolution had taken a new turn. The body had been fashioned; it was now the turn of the mind. Henceforth evolution was to be the story of man's soul.

Now we can see how it was that this creature of the forest felt within himself a movement away from his animal instincts. The power of Life was concentrating all its yearning for improvement on his brain. He was to be the Adam of a new race. No longer was the elephant to excel in strength, the tiger in swiftness, the serpent in subtlety, the ape in knowledge.

MAN LOOKS AT HIS WONDERFUL HAND, AND BEGINS TO THINK

No longer was the Earth to remain a vast wilderness. No longer was time to lack a chronicler. Life, pressing forward in its passion for improvement, needed a gardener, a discoverer, a historian. In man it had found its opportunity.

The first difference in man, distinguishing him from all the other creatures, was observation. Think about that word, for it is the foundation of every single thing that has happened since the dawn of human history. Man found himself looking at things with a particular attention.

Perhaps the first thing he looked at attentively was his own hand, turning it over and over, closing and unclosing its fingers, examining the bend of the knuckles, observing the tension and relaxation of the muscles. Never had the lion reflected on its paws, or the parrot on its wings or the whale on its tail. Never had any creature wondered if it might not do something else with its limbs—something different from instinctive action. But man, observing his hand, reflected on it, and wondered.

We must remember that as yet there was no language. There was no name for any creature, no term for any thing. Man did not say to himself, "I have a hand, and my hand is composed of four fingers and a thumb." He did not look about him and say, "This is a tree, that is a flower, and yonder goes a panther." He had no words of any kind in his mind, no speech on his lips. Like other animals he uttered sounds expressing satisfaction or fear, like other animals he could convey to his fellows in an instant the feeling of alarm or the sense of caution; but neither the things about him nor the sensations within him had any name.

MAN WONDERS IF HE COULD NOT HAVE DONE SOMETHING BETTER

We must picture him at the dawn of human history, standing in a maze of wordless thoughts, torn between the two paths of Instinct and Reason. We must not think of him as a creature suddenly dumped down on Earth with no experience to help him. His experience reached right back to the first stir of life on this planet. He was no more frightened of the world than the ant and the bee are frightened now. He knew many things. He knew quite as much as the elephant, the bear, and the snake. But he was more confused than any other creature because, whenever he did anything instinctively, a movement within him suggested that he might have done something quite different—something better.

This was a new birth on our planet—the birth of mind. Instinct said to man, *Do this!* so imperiously that he did it at once, just as a tiger and a jaguar do what instinct tells them; but, after man had obeyed his instincts, reason bothered him with questions: Was that the best way to act? Might he not have done something better? The next time the same thing occurs let him think before he so blindly obeys the unthinking impulse of instinct.

THE MORNING WHEN A MAN RAN FOR HIS LIFE

A tragic position! How much happier is the bird that wings and sings without thinking how or why, that builds its nest exactly as its ancestors built theirs ten million years ago. But, with the tragedy, what a marvellous romance! Man may be torn between instinct and reason, he may be confused and perplexed, but at least he has something to console him for this civil war within his brain; he has a feeling that he can outwit his enemies.

Imagine him setting out one morning in the fall of the year to pick blackberries

for his family. He is bending over a bush when he hears a soft padding noise behind him. He turns his head. A few paces away is a huge bear. Instinct bids him fling away his berries and run for his life. He charges up a hill. Breathless and terrified he reaches the top. He looks down, and there is the bear climbing after him. Instinct says *Run !* He obeys, but catches his foot in a huge stone and falls. Reason, as quick as instinct, says to him : " Don't you remember how you took a little stone in your hand yesterday and threw it at a tree ? " He springs round, seizes the big stone in his two hands, lifts it above his head, and hurls it at the bear.

A MAN PICKS UP A STONE AND THROWS IT

A wonderful thing has happened. The stone struck the bear on the side of its head, and the bear lost its foothold and went tumbling down the hillside. Now it lies at the bottom of the valley, dead !

Man rushes back to his home in the forest, and brings his fellow-men to the hillside. He shows them the bear. He points to the stone. He acts the scene for them. He lifts the stone, raises it above his head, and flings it from him. The others imitate him. They chuckle and grin. The first game of cricket is being played.

Something has come of observing the human hand, of not taking that hand for granted, of wondering about it, reflecting about it, experimenting with it. Man has discovered that he need not run away. His hand has become his plaything. He takes up a stone and flings it at a snake, twenty yards away. A bird flies over his head, and he flings a stone into the air. He stumbles over the bough of a tree broken by a winter's gale ; he drags it along, pulls it after him, breaks an arm of it off, swings the branch over his head, flings it ahead, picks it up again, and takes it home with him.

THE MAN GOES INTO THE FOREST IN SEARCH OF FOOD

One day his family is hungry. He goes out into the forest with his cudgel and looks for prey. A rabbit starts up under his feet. A blow of the stick and the rabbit is dead. He remembers a place in the forest where rabbits came out after sunset and just before dawn. He goes with his cudgel, hides, and waits. No longer need his family fear for food.

The cudgel does something else for him ; it enables this feeble and defenceless creature to leave the woods and adventure himself more boldly in the open. He is now a hunter. He can creep up behind a sleeping animal and kill it with his club. He can throw a stone so accurately that no bird within forty yards is safe from him. He wanders farther and farther afield, and comes presently to a broad river. He sits down to observe this mighty flow of water. In a pool he sees fish, and studies them. These, too, are not to be taken for granted—these large legless things which move in water like a flash of light ; not merely as the buffalo or the hippopotamus looks at fish does man look at them.

In the midst of his observation a bough of a tree comes swirling down the river. He watches it with curious eyes. That, too, can move in water, like the fish. But this tree does not move under the water : it moves on the water. He watches it intently. Suddenly it is caught by the branch of an overhanging tree and prevented from moving. A bird flies up the river, sees the log, and perches on it.

Slowly there comes into the mind of man an idea which is destined in far-off centuries to revolutionise human life. If he stood on that tree where would it take him ? If he rode upon it, kicking his legs, could he make it bear him across the river ?

MAN FINDS AN ACORN THAT WILL GROW INTO A TREE

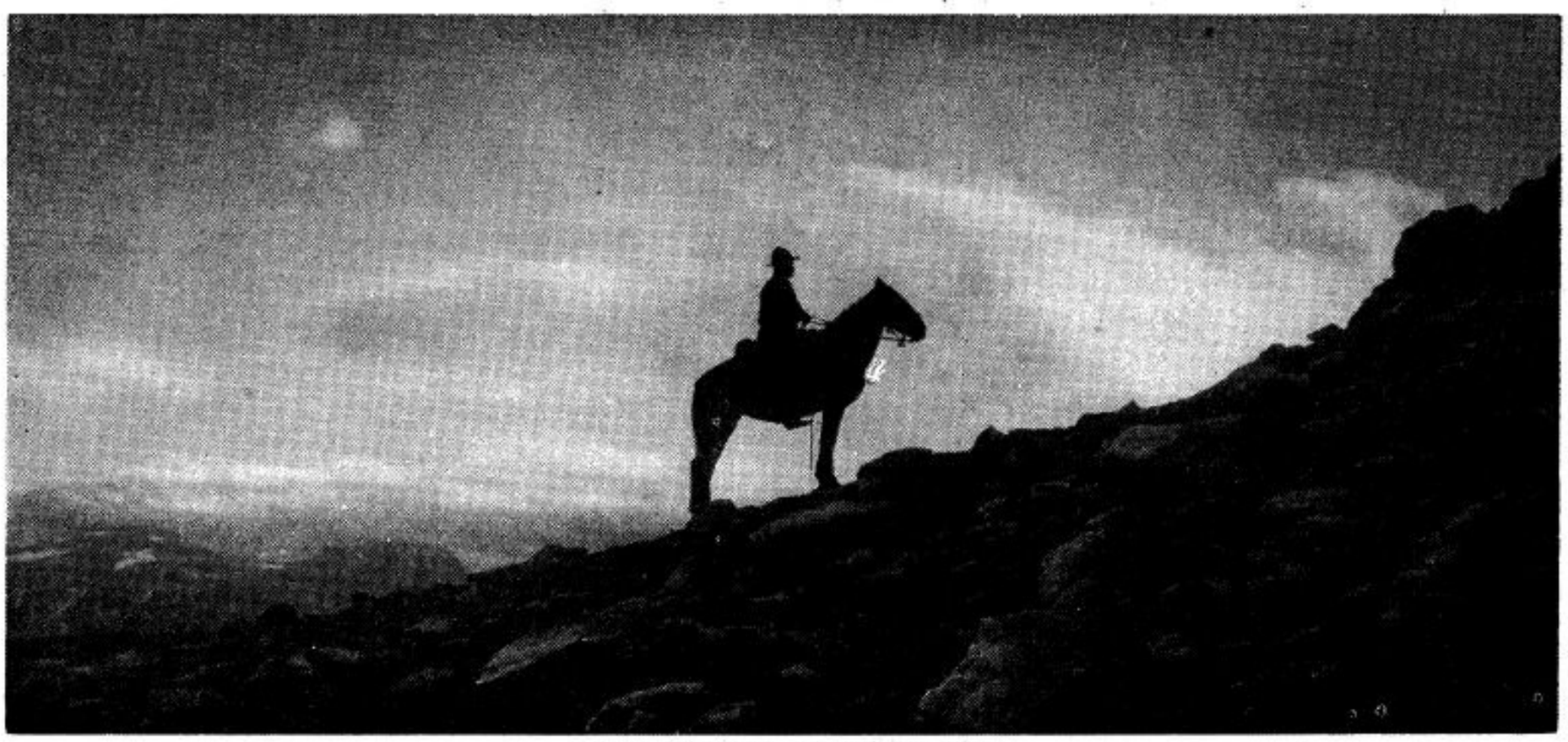
On his way home he thinks of riding logs of wood over great rivers, and tells himself strange stories of adventures on the other side of those flowing waters. Presently he passes a cave in the hillside. He peers into it. Nothing in there. He enters. It is warm. Nothing could attack him from inside. Only the entrance would need to be guarded. Why should he live for ever in the forest ? It is better to live in the cave. It is nearer the great waters.

One day he is sitting at the mouth of this cave when he notices little sprouts of green in the earth. He picks up the soil with his fingers and discovers at the end of such sprout a seed which he himself has flung away after eating berries and fruit. He notices that some of the sprouts are strong and others weak. They are strong where the ground is open, weak where they have fallen among thorns.

He begins to observe the earth with attention. The acorn which drops from the trees is not only food for swine ; *it grows into a little tree.* The grain he loves to chew as he walks, falls into the earth and

comes up again as a plant. He collects handfuls of their golden grains and carries them back to his cave. He breaks down the brambles, sharpens a stick to loosen the roots, pulls them up from the ground, and plants his seed.

On another day he comes upon a pile of bones at the foot of a hill. A number of wolf-like creatures start away from them as he approaches, growling as they go. How did they come there, all those bones? As he stands watching, a buffalo comes turning over and over through the air from the top of the hill. It crashes among the bones, and lies still. At the same moment, a wolf-like creature appears breathless at the top of the hill looking down. The man climbs up the hill. He watches. One day he sees a buffalo chased by these wolves



MAN CLIMBS UP THE HILL

across the open, headed for the precipice. He says to himself, "I need not go hunting for animals. I need not fight with them." He becomes a trapper.

His wife flings meat to some of the creatures about his cave. The smallest of them become friendly. In winter time they come even to the mouth of the cave. Presently they take meat from the hand of the man's children, and play with them. The man thinks to himself, "Why should not these things hunt for me?" The hillside becomes his trap, and the wolf becomes his dog.

His needs multiply with his victories over Nature. He wants something more than a stick for breaking the earth to receive his seed. He wants something more than his two hands for dragging home his loads. He wants something more than a log for crossing the rivers.

How is he to get those things? Is there in all nature such a thing as a steam-plough, a railway engine, a steamship? No, but in his own mind there is the idea of a spade, a wheel, and a boat.

He has invented a crude language. He can tell others what is in his mind. They are all agreed to call a tree a tree, a bear a bear, water water, wind wind, and wheat wheat. They have names for themselves. One is father, another is mother, this child is son, and that daughter. When a fire rages through the forest they call it fire. They can speak to each other of fire. They notice that two flints struck sharply together produce the same thing on a tiny scale—fire. They have observed that fire eats up dried things quicker than damp things. They make a heap of twigs and dead leaves; they strike flints against it, and presently it burns.

A vegetable root which has got into this fire smells good. They taste it and like it. They fling flesh into the fire, and taste that. It is good. Animals are afraid of fire. Very well, when he goes hunting, he will light fires at night and that will keep tigers away from him.

All this movement away from instinct is the work of observation. Man is unafraid of the universe. So far he is only a hunter seeking power over his prey. He has never lifted his eyes from the earth. He is like the rest of the animal kingdom except in this—that with him instinct is not enough. Superstition is yet to come. Death is not yet either a tragedy or a mystery. Savage man has many questions in his mind, but they concern only his stomach.

The Great Journey of Man is begun.

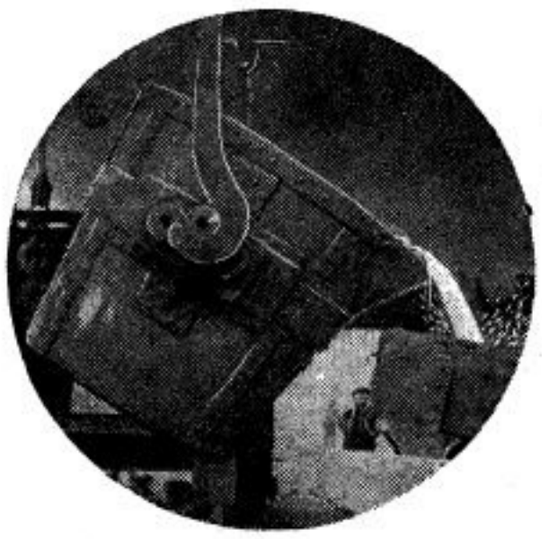
The Story of the Things We See About Us Every Day

What This Story Tells Us

ALL around us is the mystery of familiar things. How does the blade of your penknife come through the roaring furnaces into your pocket? How does your Waterman pen come from the heart of a forest, from the top of a mountain, from the depth of a mine, from the fiery crater of a volcano, to your desk? How does a piece of cotton, growing like a flower in Egypt, come on to a reel on a sewing-machine? How does a newspaper come out every day? Through what marvellous processes do the familiar things about us pass before they reach us? Here we shall look round at many familiar things—at pens and pencils and coins, at railway engines, ships, and aeroplanes, at silk and cotton and wool, at sugar and salt and tea, at gas-meters and cameras; we shall see, too, how tunnels are made under cities and rivers; and many other fascinating things.

IRON FOUNDATIONS OF ENGLAND

AN old man lay dying. He called his sons to his bedside and said to them: "I leave to you, my sons, all the wealth I possess. There is a great mass of riches buried underground in my vineyard, but the exact place in which it lies you must discover for yourselves."



The old man died, and was mourned by his sons. When their time of mourning had passed, they took spades and rakes into the vineyard, and dug and raked the soil with all their might, taking care, of course, not to injure the roots of the vines. Not a particle of gold did they find. There was no gold to be found, and they were sorely disappointed.

But the work they had done in the vineyard caused the vines to grow as they had never grown before. The next year the sons had an enormous crop of grapes, which they sold for a great sum of money. They then understood the meaning of the trick their wise father had played upon them. He had truly left them all the wealth he had, but it was in the soil, and their labour was needed to turn it into riches.

Now, Nature has been a wise and kind parent to those of us who live in Great Britain. She has not sown our fields with diamonds or threaded the hills and valleys with gold, but she has planted in our soil rich deposits of iron and coal. She has given us the restless sea for our frontier and boundary line, and iron for our backbone. The iron and coal in her soil have given England her greatness. It is a greatness of which we may be proud, for the wealth which has made us rich and strong has been gained, like that of the sons in the vineyard, by honest labour.

Can we picture what Great Britain would be like if the use of iron were not known? Everything made by man would be different. There would be no great ships to carry us across the sea, for without iron and steel we could not build anything better than the rough canoes which the primitive men used before history began. There would be no fine houses; we should all have to dwell in huts such as savages make; for without iron we could not build houses requiring the use of metal tools.

We could not have printed books or papers; we could not have proper clothes; for there would be no machinery with which to make them. There would be no

such things as aeroplanes or trains or motor-cars, and horses would be of little use to us if we were unable to shoe them with iron.

How did men manage without iron? They used flint stones—sharp pieces of flint which they chipped off larger stones. Bones served for knives and forks, and for needles with which to stitch together their garments of roughly tanned skins of animals. It would have been no use looking round for a knife to sharpen a pencil; there would be no knife, and there would be no pencil; we should have had to burn a piece of wood for a pencil, and scrape it to a point with a flint.

THE MEN WHO TOLD THE BRITONS OF THE TREASURE IN THE EARTH

How it was discovered that iron is of service to man nobody now can say. There in the soil lay mines of wealth more than man could calculate, but, for all the use it was, the iron might have been in the clouds. By and by wise men of the East came to Britain to buy things and to sell other things, and perhaps they told our Britons how people in India took rough stuff from the hills, put it into a fierce fire, and melted out of it stuff which, when freed from the rock in which it was embedded, could be heated and made to bend into all sorts of shapes, and be made sharp so that it could remain sharp and durable when cold. Anyhow, our Britons, without the help of any civilising influence, did discover how to melt iron, and when the Romans came they found the brave Britons armed with iron weapons.

The Romans already knew how to work iron, for the art had been practised earlier in Greece. When they came to stay, they soon found where the Britons got their iron ore, and all the time of their occupation, a period of about five centuries, they had large ironworks in the Forest of Dean.

FIRES KEPT BURNING FROM THE CINDER-HEAPS LEFT BY THE ROMANS

But great as were the Romans, they knew little about ironwork; they wasted far more metal than they were able to use, so poor were their methods. How much they wasted we know today from the fact that long afterwards twenty furnaces were kept at work by Englishmen for between 200 and 300 years, working at nothing but the mounds of cinders the Romans had left in the Forest of Dean. In the cinders were enormous masses of iron the Romans had been unable to extract, and they proved a mine of wealth. We are bound to couple coal and iron, for it is by the use of coal for smelting that our industry in iron has grown to such a vast extent. Yet it took our forefathers over twelve centuries to learn it. The material the early ironmasters used was burnt wood, which we call charcoal.

As this fuel answered well enough, they simply laughed at the idea that coal could do their work better. A clever man, named Dud Dudley, tried coal for his furnace in 1619, the first man ever to do so, and others tried to copy him; but the plan was not properly understood, and, instead of our store of iron being increased, the output of iron actually went down for thirty years. Then the practice of first making the coal into coke began, and gradually succeeded.

Still, the iron that we made toward the end of the eighteenth century was poor stuff. It was brittle and bad, and could not be made hard and tough and at the same time capable of bending just as the smith desired. But in 1784 Henry Cort invented the puddling process.

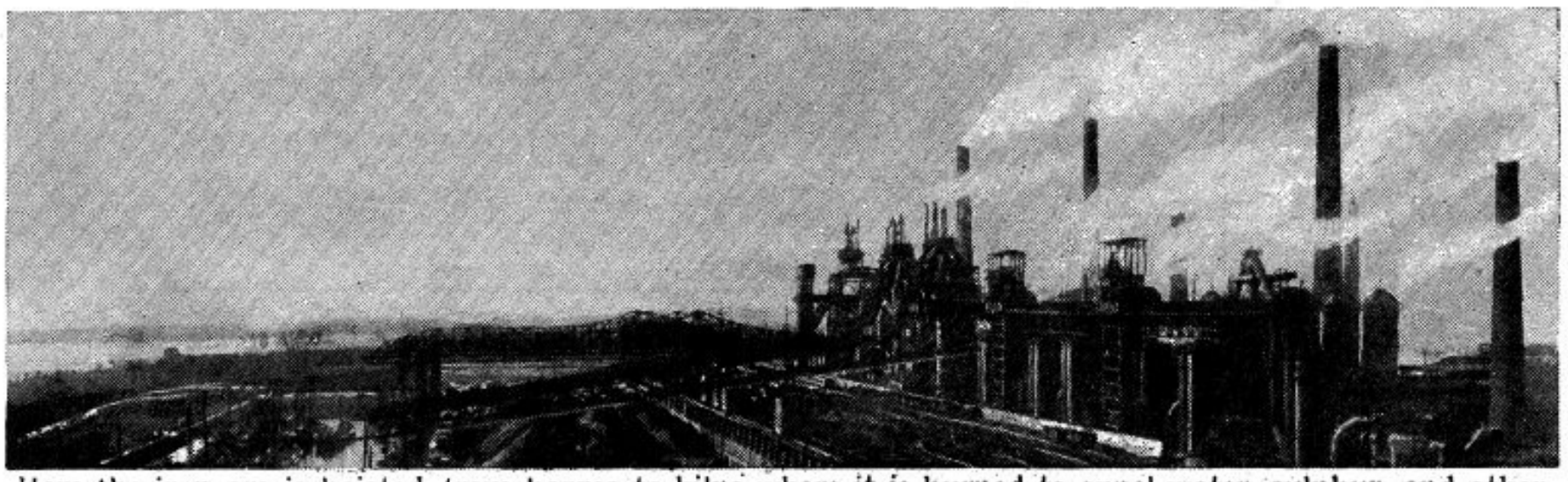
GIANT THAT HELPED TO MAKE BRITAIN THE MISTRESS OF THE WORLD

The puddler, one of the hardest workers in the world, takes the iron which has been smelted (or melted) in the blast furnace, and places it in a special furnace, and when it reaches melting point he stirs and stirs it with an iron rod, causing the iron to collect together while the bad parts flow away. Then, when this has been done, the good part is taken out in practically a solid ball, and is run through great rolling mills, which squeeze liquid impurities out of it like water from a sponge. Thus we get pure iron.

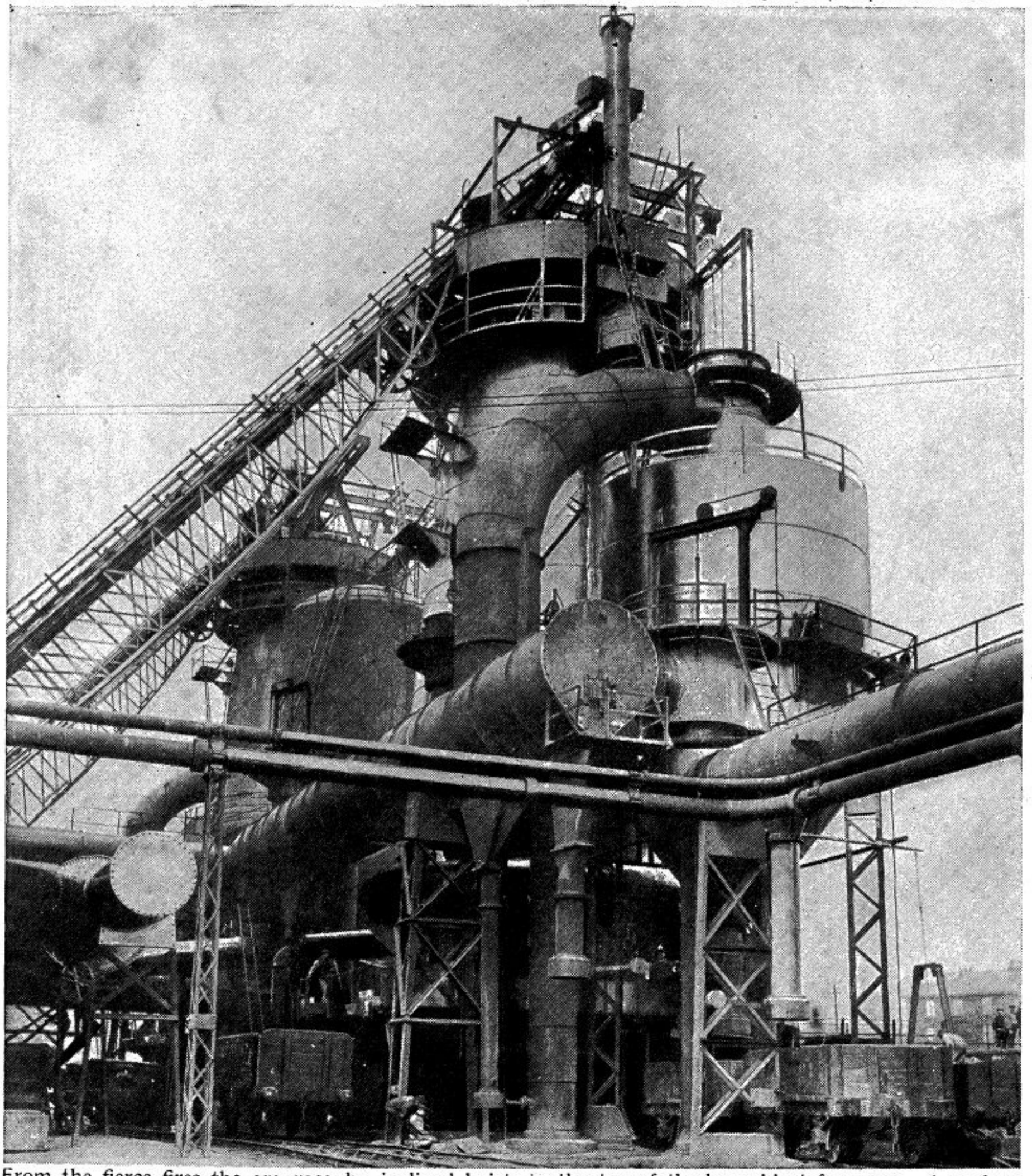
We all depend today upon the iron and steel founders. From them we get our pens and our instruments for doctors; they supply the material for our ships, our engines, our cars, and our wonderful modern bridges; to them we owe our marvellous machinery, from the vast Nasmyth hammer down to the tiny needle which works the telegraph; and also all the tools with which the work of the world is carried on.

The miser may hoard his gold, but it is iron which keeps the world going. Truly Nature gave us a wonderful fortune in our soil, but the will and skill of our people have realised the fortune that lay in the earth, and made England the mother of the greatest Commonwealth of nations of which man has ever heard.

WHAT HAPPENS IN AN IRON WORKS

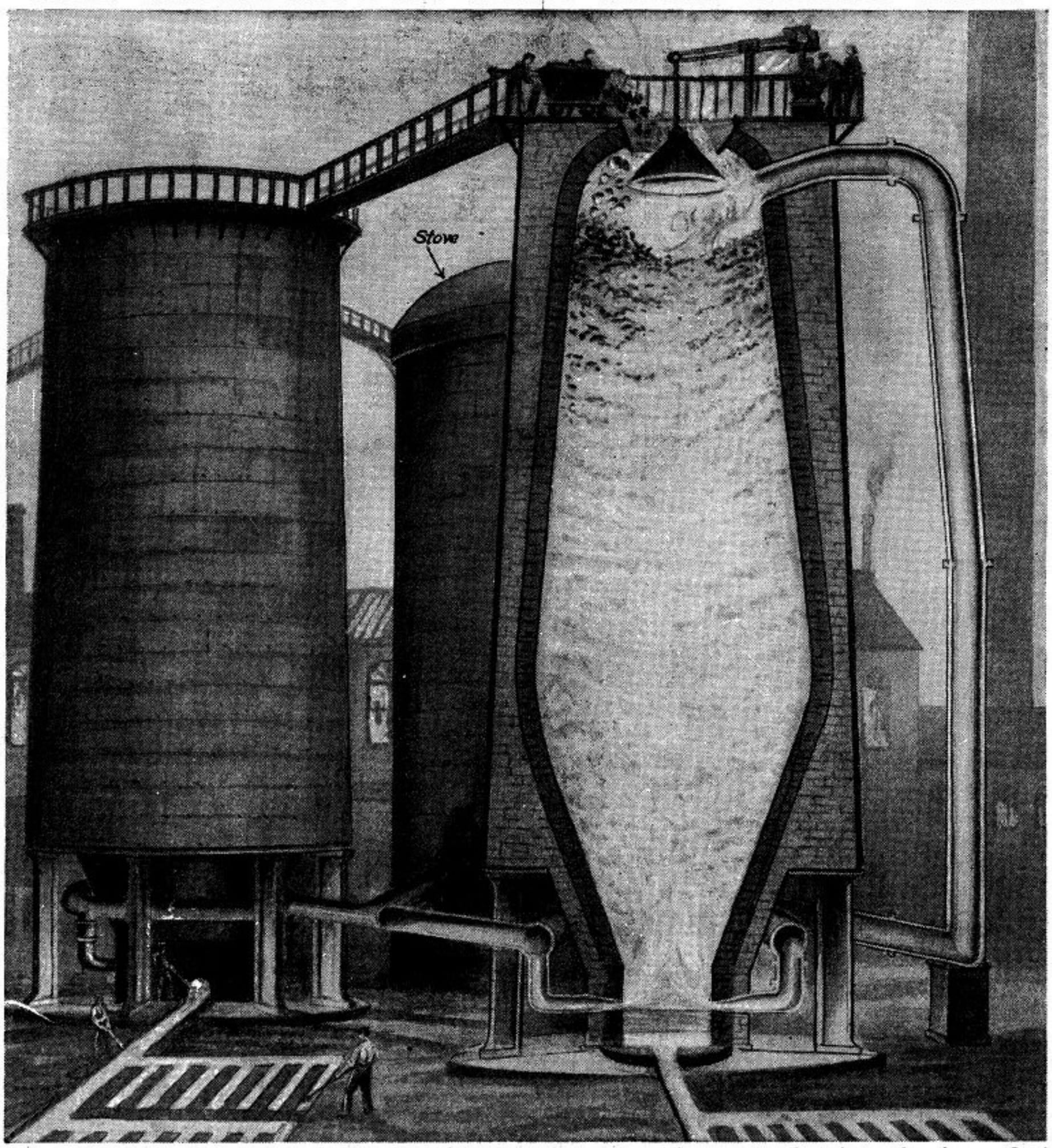


Here the iron ore is hoisted from barges to kilns where it is burned to expel water, sulphur, and other substances, and to render it porous so that it heats readily in the blast furnace. British blast furnaces at work have varied from fewer than 100 when trade is bad to more than 300 in prosperous times.

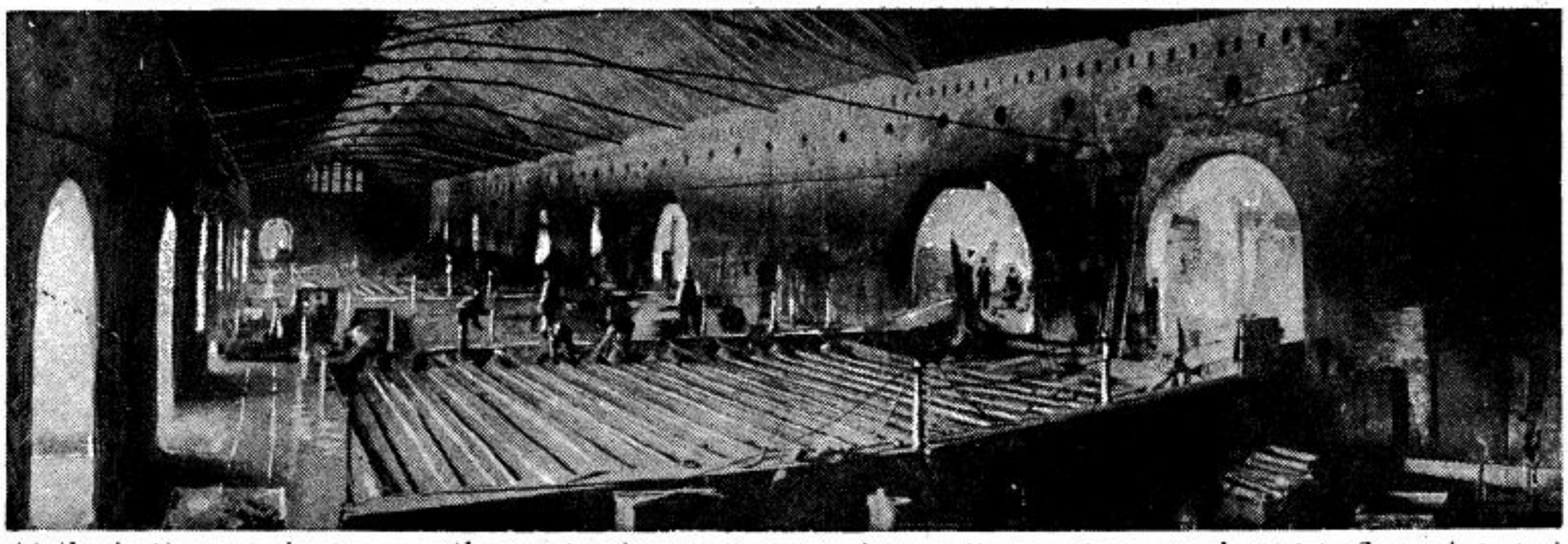


From the fierce fires the ore goes by inclined hoists to the top of the huge blast furnaces. A modern blast furnace is often over 80 feet high and 25 feet across, and can produce 700 tons of pig iron a day.

THE TREMENDOUS FIRE THAT MELTS IRON

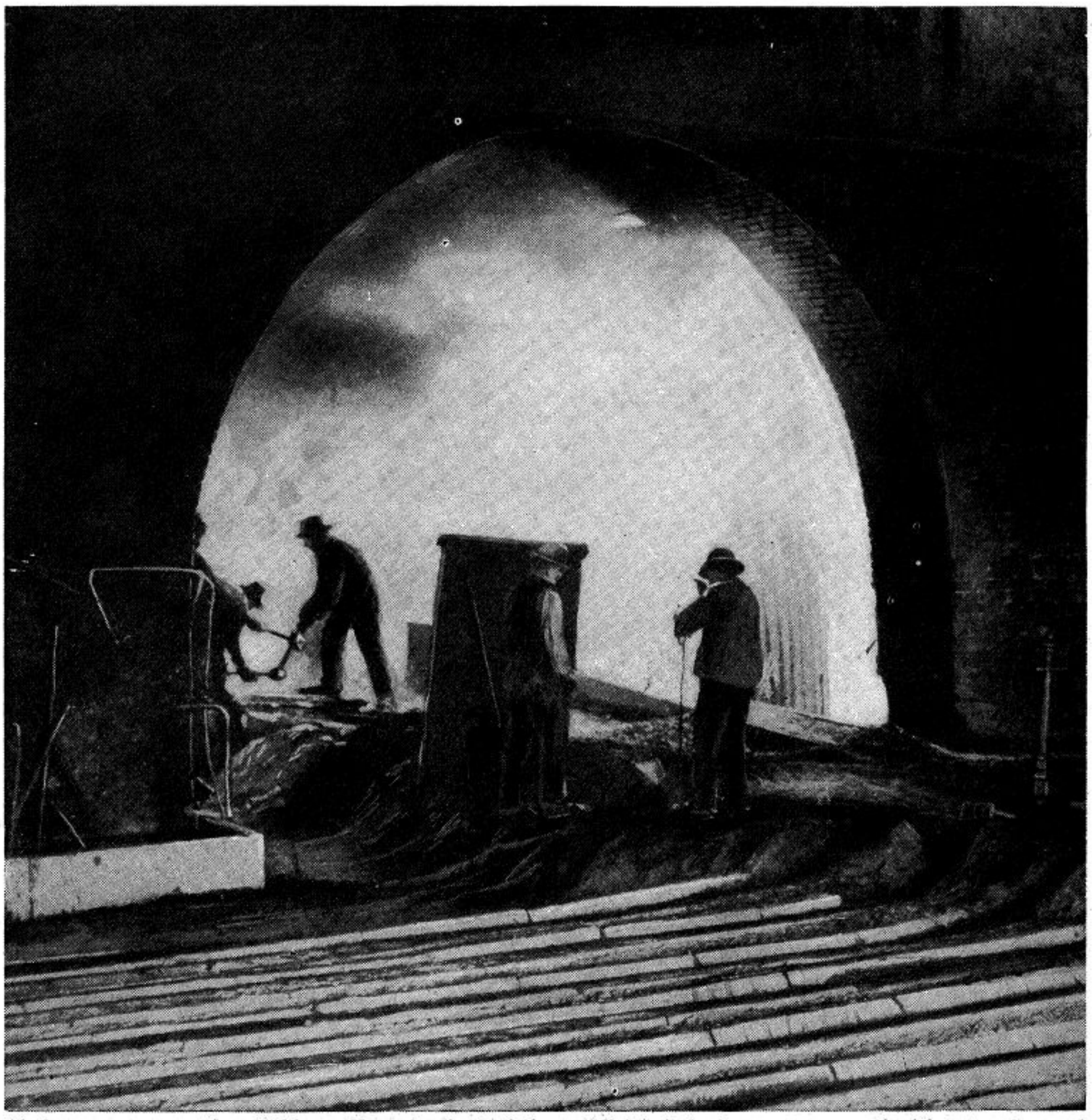


This section of a furnace-tower with the lid open, shows how the ore is shot into the fires. Coal and a flux, such as limestone, are also added. The lid closes and the hot air is forced into the bottom of the furnace. The blast of air through the fiery core melts the iron until it runs like water

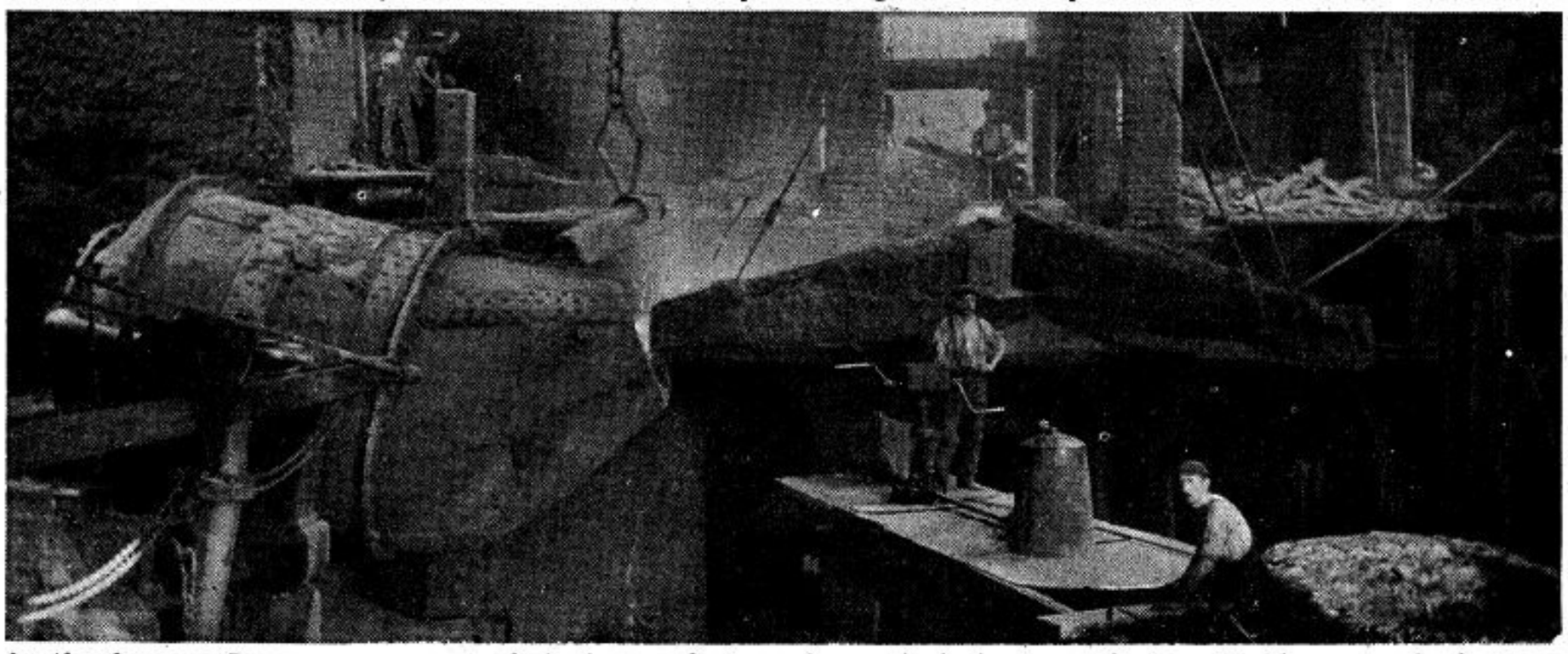


At the bottom of the furnace the molten iron collects, and from time to time is allowed to flow white-hot through a tap-hole into grooves in the ground, and so into sand moulds. Here are seen the sand moulds where the iron lies until it cools and can be taken out in solid bars. The slag or waste flows off through another exit. The waste gases are used for heating kilns and ovens, and, purified, for driving gas engines.

THE MEN AT THE GREAT FURNACES

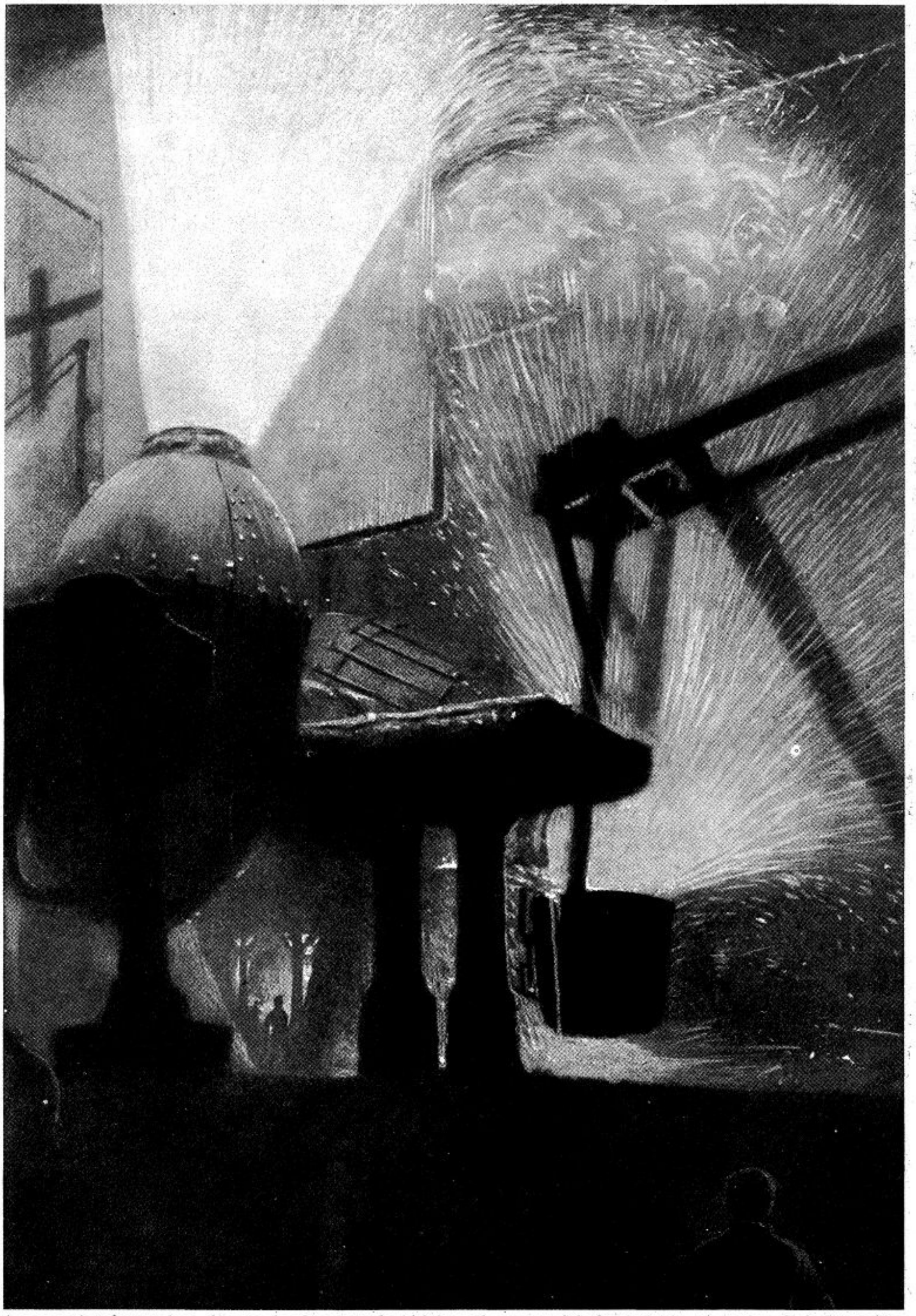


All furnaces are not built alike. Here, in place of the small tap-hole, is an open-mouthed furnace, beyond which is an inferno of fire, its heat so intense that protecting screens are provided as shelter for the toilers.



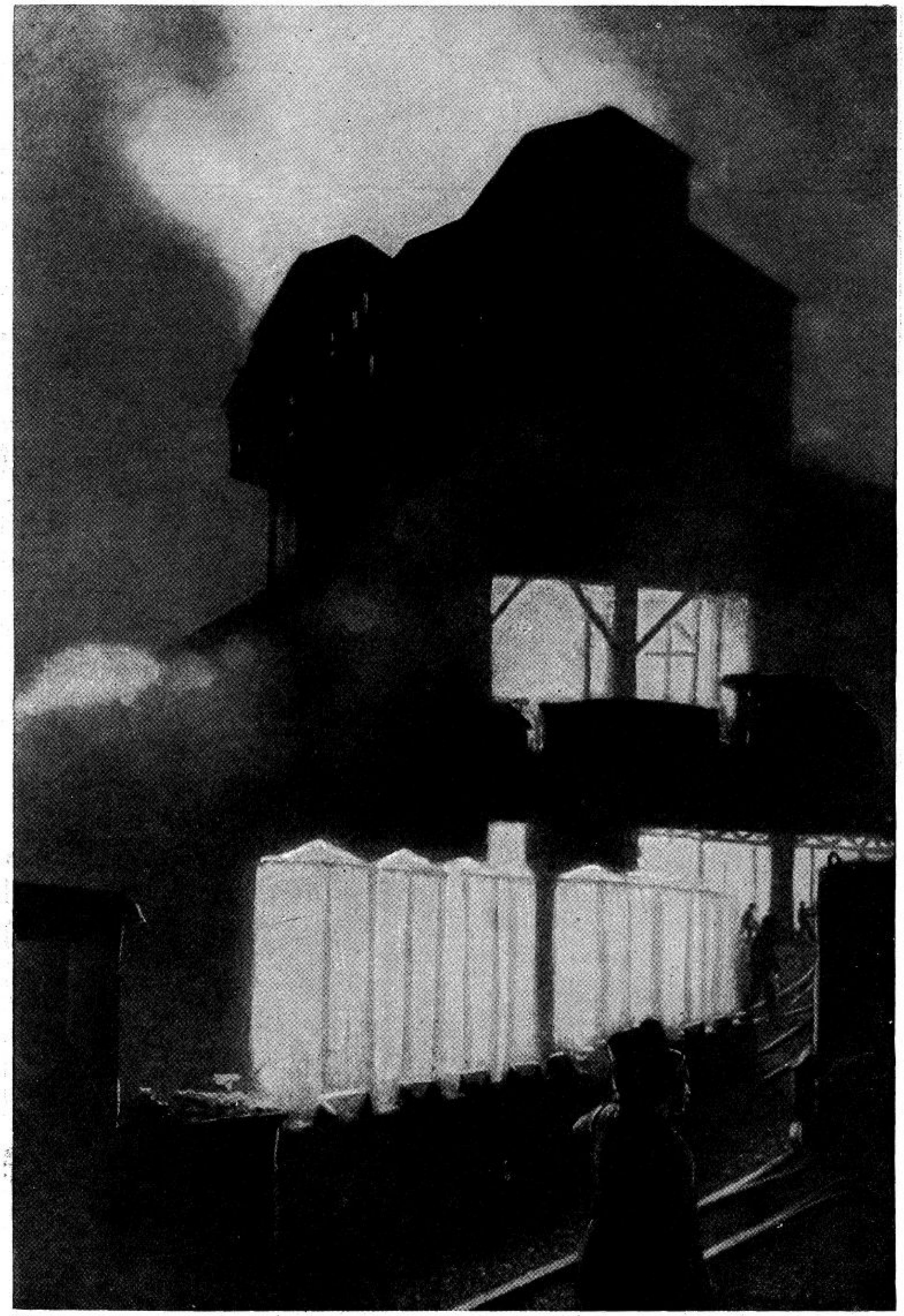
In the famous Bessemer process of steel manufacture, bars of pig iron are first melted in a cupola furnace and then run direct into a Bessemer converter, which is here shown thrown horizontally to receive it. Steel is a malleable and tough alloy of iron and carbon. For special steel other metals may be added.

THE BLAST OF AIR THROUGH A MOLTEN MASS



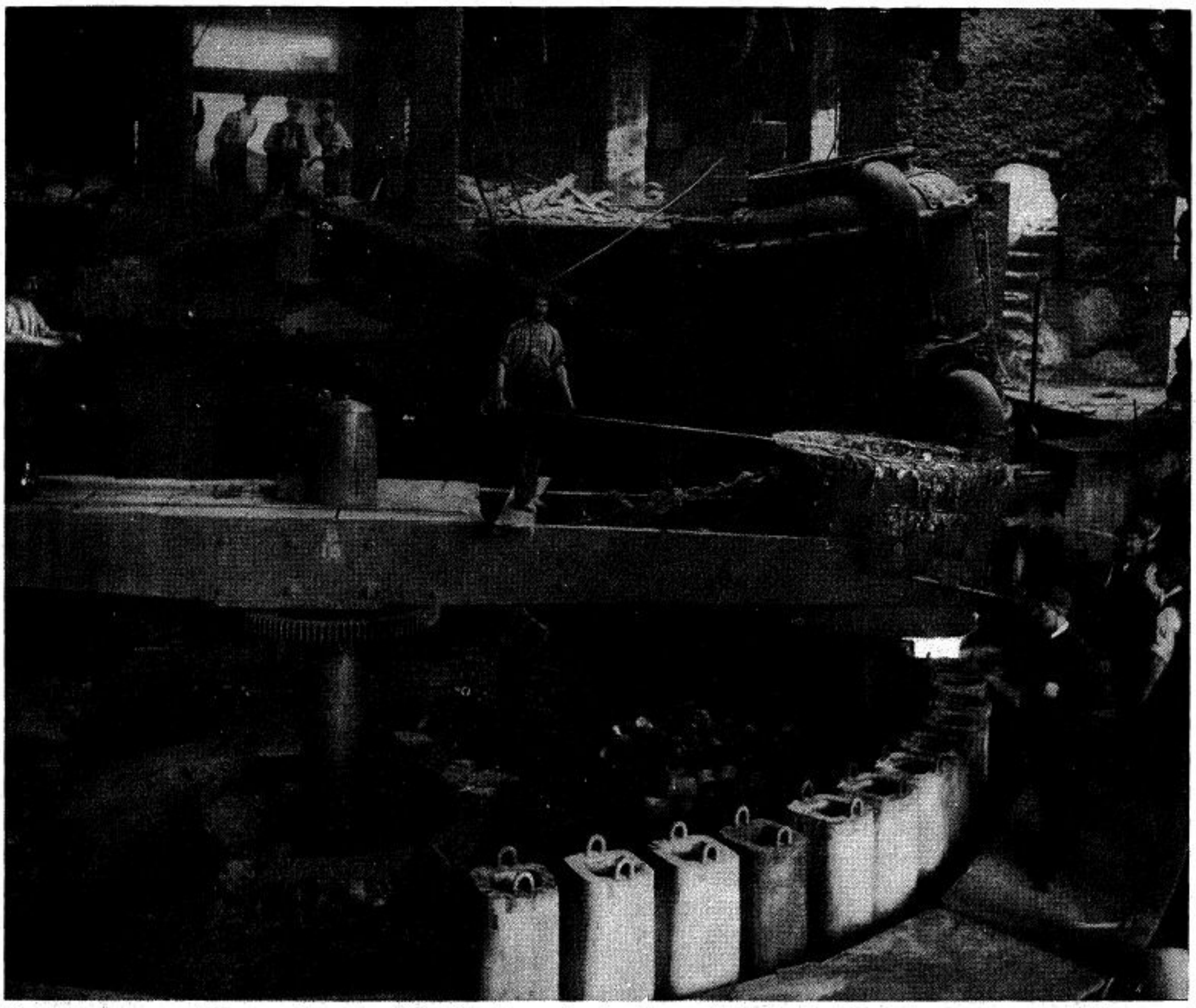
A converter for 15-ton charges is about 25 feet high and may weigh from 60 to 70 tons. It is turned to the vertical and a mighty blast of air, in numerous small jets, is forced through the molten pig iron. For some 15 or 20 minutes a blinding flame of varying hues roars from the mouth of the converter. Carbon is added, and then the monster egg tips to give up its molten mass into a ladle carried on a crane.

A TRAIN OF GLOWING INGOTS

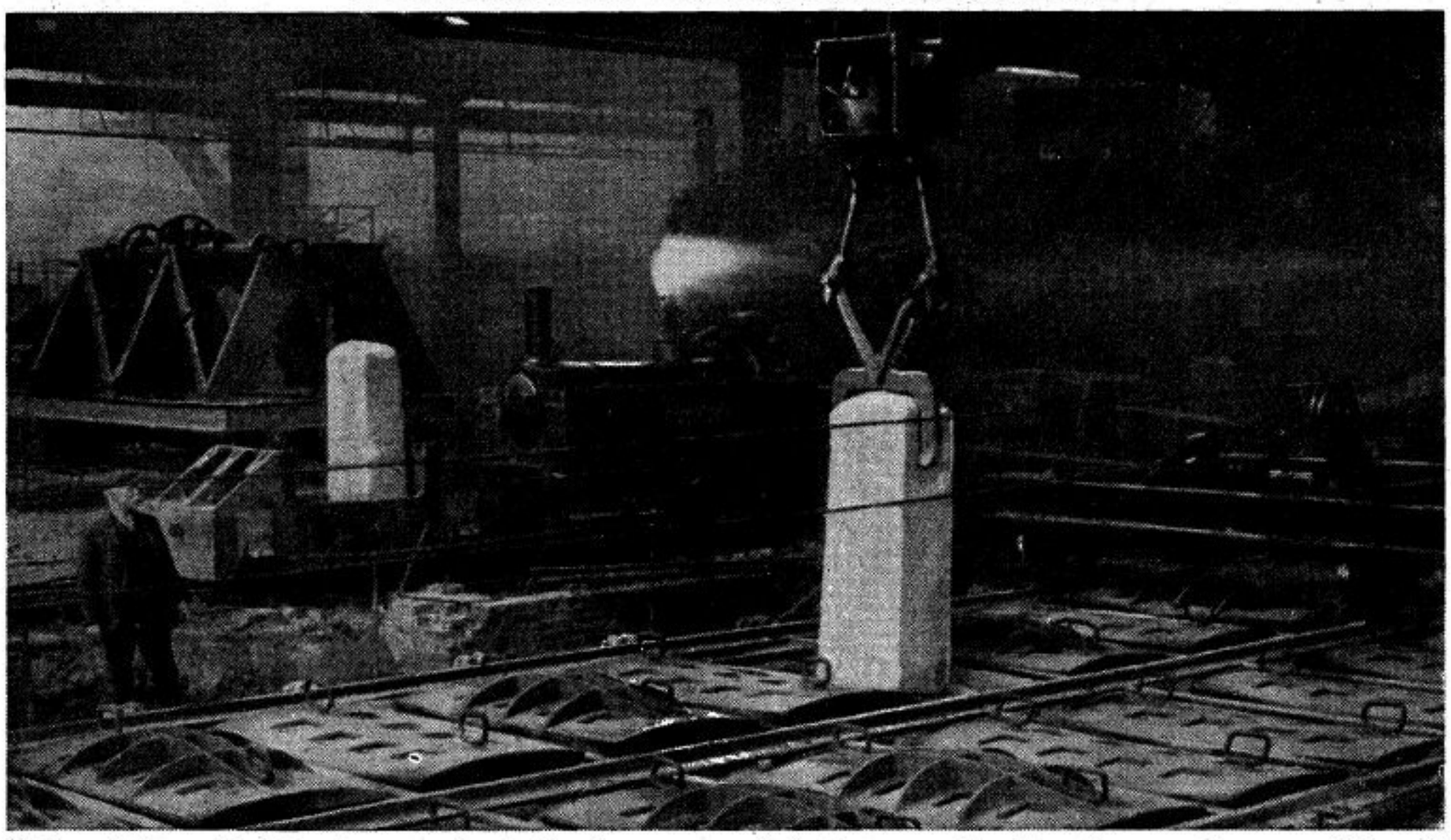


The crane now swings over, and from the bottom of the ladle the liquid steel is poured into ingot moulds standing in the casting ring. When somewhat cool the moulds are lifted from the partly solid ingots by ingot cranes. The ingots are carried to the heating furnace in the rolling mills.

THE STEEL FLOWS INTO THE INGOT MOULDS



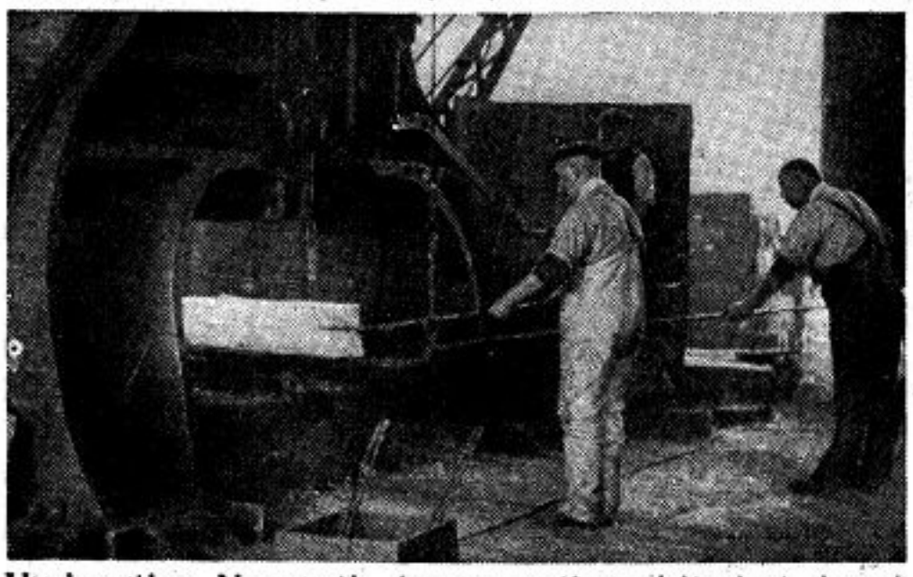
Here is a view of the molten steel flowing from the bottom of the ladle through a nozzle into the ingot moulds. A large ingot may be about 19 inches square and weigh 50 cwt.; for rails the ingot is about 14 inches square and weighs perhaps a ton and a half



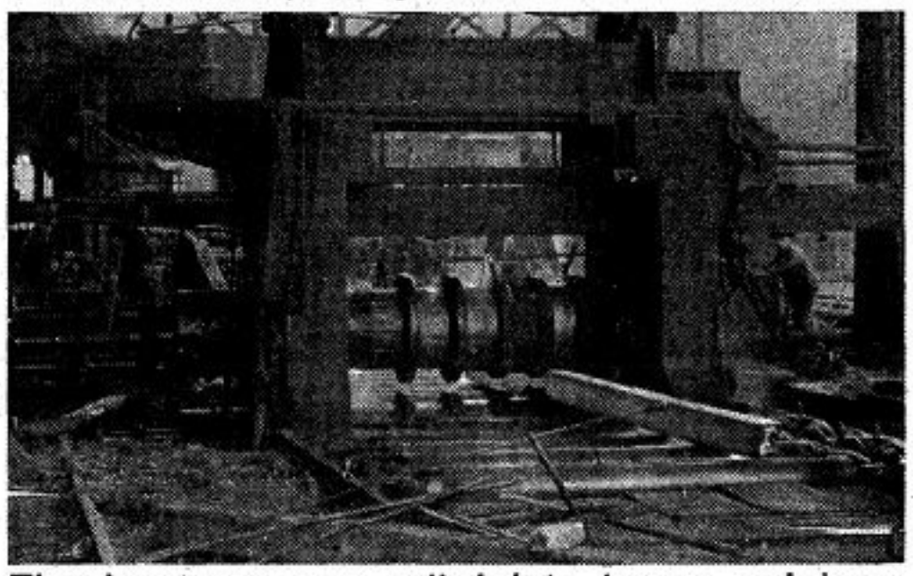
Before being rolled, ingots are reheated in furnaces sunk in the ground. Here, by crane tongs or "dogs," an ingot is being lowered into a furnace to make its temperature uniform.

THE WHITE-HOT STEEL READY TO BE SHAPED

From the reheating furnace comes the ingot to be hammered into billets or rolled into bars and sections for industrial purposes. Here, in the glowing mass, is the beginning of a steel marvel.

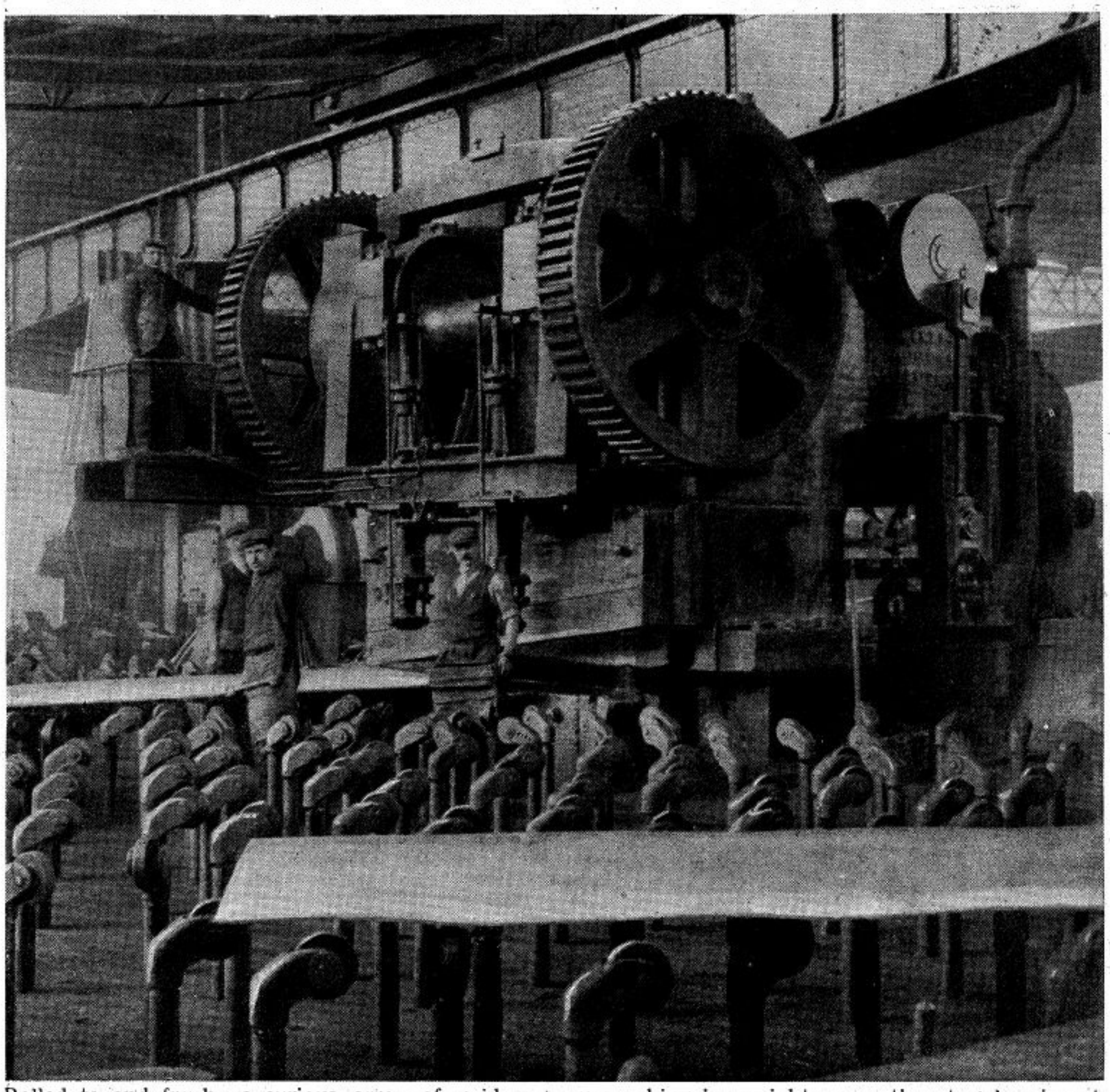


Under the Nasmyth hammer the white-hot ingot begins to take shape.



The ingots are now rolled into beams and bars. Here a bar is seen coming through the rollers.

THE MACHINE THAT CUTS STEEL IN TWO



Rolled to and fro by a curious array of guide wheels working in upright arms, the steel bar is cut through, as easily as paper is cut with scissors, by the powerful machine here shown.

Finally the finished product, loaded in trucks, leaves the great steelworks for all parts of the world. America is by far the largest producer of iron and steel, and besides our own country other countries with large outputs are France, Russia, Germany, and Belgium.

Plain Answers to the Questions of the Children of the World

What These Pages Tell Us

FOR ever in this life we are asking questions ; for ever, throughout this world, wise men and children are saying "I wonder why ?" Where do we come from ? Where are we going ? What happens when we are asleep ? What brings a mighty forest from a few small seeds ? Has the sea been moving for ever and ever ? Who holds the stars up and lights them at night ? Who puts the thoughts in our heads and the feelings in our hearts ? How does a bird find its way from Africa back to the same little nest in Kent ? To all of us come such questions, and never will they stop while the world goes on, because out of the answer to one question another question grows. So it must always be, for the wonder of the world has no end ; the longer we live the more we wonder about life. Here are hundreds of questions asked by readers of this book.

WHY DO I LAUGH AND CRY ?

YOU laugh and cry because you are "made that way." It depends upon the way in which your brain and body are built. After all, you laugh when you are tickled, even though you may not be pleased, and that is really easier to explain. If a bright light suddenly strikes your eye, you shut it because your brain is made so as to make you reply in that way.

That is a simple way of replying, and laughing when you are tickled is really the same, only that instead of doing only one thing, you do a number of things all at once. You move many muscles of your face instead of merely moving the muscles of your eyelids. You also move the muscles you breathe with in an unusual way, and the muscles you make sounds with. It is this particular movement of all these muscles together that we call laughter, and it is really a reply to the tickling, just as drawing away your foot is a reply when someone tickles the sole of it.

It is the same with crying as with laughing. We do not know why our brains should be so made, for, though there is much use in tears when we are not crying, there is no use in crying when we are hurt.

When people grow older they find this out, and usually do not cry when they are hurt. The highest part of the brain is the master of the lower part, and can order it to do things, and forbid it to do things. Now, it is the lower part of the brain that replies by crying when we are hurt, so that even the tiniest baby can cry. But when we grow older we tell the lower part of the brain that it must not do as it feels inclined to do, and so we stop crying.

There is no known reason why tears should come when we cry, but there is a very good and beautiful reason for the tears we are really making all the time we are awake, though we know nothing about it. You know that every few seconds you wink both your eyelids at once. If you did not your eye would soon cease to work.

Now let us see what winking does for the eye. When the eye is open, the front of it is exposed to dust and dirt, and also the front of it is apt to get dry, and if it got dry we could not see properly. Yet, how is it that, though we never wash the front of our eyes, they are always clean ? *It is because we wash them every time we*

wink. Up above each eye, rather to the outer side, is a tiny thing called the tear-gland, and all the time we are awake this is slowly making tears. Then when the front of the eye feels itself becoming rather dry, and perhaps a little dusty, it tells the brain, and down comes the eyelid with a tear inside it, so washing clean the front of the eye.

If you look at the inner corner of your lower eyelid you will see a tiny little hole. The tear runs down this and finds itself—where do you think? When you have been crying a great deal, do you not have to blow your nose? The reason is that tears run down into the nose. All the time we are awake this goes on, keeping our eyes moist and clean; but when we cry we make far more tears than we need, and so they get spilt over the edge of the lower eyelid, and run down our cheeks.

But though the tears, when we are not crying, are so useful that we could not do without them, yet it is no use to make too many of them. Let us not shed too many tears in this beautiful world.

What Does Encyclopedia Mean?

This is quite an easy question, even though the name of this book is longer than any word in it. *En* means *in*, and is added to make the word stronger; indeed, the word is often used without the *en*, and just written *cyclopedia*. Then the next part of the word comes from the Greek word *cyclos*, a circle, and tells us that the book is not about one thing only, but goes all the way round knowledge. And the last part of the word is just the English form of a Greek word *paideia* which means teaching or instruction. So this book is a circle of teaching.

But the name is better even than it looks, and perhaps ours is the only kind of book that ought to have this name; for the word that means teaching comes in Greek from another word, *pais*, which means a child, because, of course, teaching suggests child, and a child suggests teaching. So the very word tells us that it has something to do with a child.

Could we Walk without our Toes?

There is no doubt that we could walk without toes, but we should not walk nearly so well, nor so gracefully, nor so safely, for the simple reason that our toes spread out over the ground to a certain extent, and so give us a greater space upon which to balance our bodies. In these civilised times, when everybody wears boots, the toes themselves are really very little used, but in the early days of the human race they were very valuable, and capable of much more movement than now. A person without toes could easily walk, but his steps would be somewhat uncertain, and his movement more restricted.

Will Frogs and Fishes Some day Turn into Animals like Horses?

The answer is No, and the reason is that these animals represent the result of many generations of gradual changes until they have been produced in the special form in which we now find them. They are, in fact, like a completely manufactured article, and are therefore as perfect in their way as the horse is in its way. The creatures from which frogs and toads and fishes sprang are not like any of these, any more than the raw cotton is like a fully-made shirt.

Is there a British Lady Mentioned in the Bible?

Yes; there was a British lady in Rome in the days of Paul, and we are almost certain that she would go to visit Paul in his prison cell, and comfort him. We read of her in Arthur Mee's book, "Little Treasure Island," where we are told that we may stand today in Rome in the house this British lady lived in. She was Claudia, wife of Pudens, and if we look at Paul's letters to Timothy we shall find that the apostle there sends her his greetings. Her house was open to Paul and the followers of Jesus in the days when to follow Him brought ridicule and peril. Her praises were sung in poetry eighteen centuries ago, and it may be, though nobody can know, that through Claudia came the first news of Christianity to Britain, for we may be sure that, holding the fort for Paul in Rome, this lady would not have left her friends at home in ignorance of what was happening in a far-off Roman province.

Where does the Tadpole's Tail Go?

At a certain stage in the life-history of a tadpole some of the cells within the tadpole's body begin to attack and devour the cells that make up the tail. The tail is gradually eaten away and absorbed until finally, by the action of these cells, there is nothing of it left. The material thus disappears, by the process which is known as absorption; that is to say, it is used up by something else.

What Makes the Sea Salt?

The Sun sucks up the water from the sea, but it sucks up nothing else. The salt of the sea has been brought to it by the rivers. These, as they come down from the land, melt away from the land anything that water can melt, and this they carry into the sea. River water is salt, too, only so very little salt that we notice nothing. Sea water is so much salter chiefly because it contains all the salt that the rivers have been carrying down to it for ages past. One of the commonest kinds of salt in sea water is ordinary salt that we use at table, but there are a great number of other kinds too. We must remember that, though table salt is the only kind of salt we usually think of, yet " salt " is really only a general word for a large number of compounds, like each other to some extent, yet different. It is a mixture of a great number of these that helps to make the sea salt.

How Many Words Do We Use?

We need not tremble at the number of words it is possible to use. The Oxford English Dictionary contains over 400,000 words, but our greatest writers find quite a small number sufficient.

Shakespeare, with all his varied writings, used only about 21,000 different words. Milton needed only 7000 different words for Paradise Lost. Some people use only about 300 different words, and most of us between 1000 and 2000 words.

The beauty of writing and speech lies not in the number of words used, but in the choice and placing of them. Simple language is the most beautiful. The finest English writing is in the Bible, in Robinson Crusoe, and in the Pilgrim's Progress, and in each of these books the language is so simple that a child may understand, while great scholars find delight in it.

What Makes a Nettle Sting?

The leaves of a stinging-nettle are covered with small hairs with sharp, hooked points, that will break off when they are lightly touched. But the nettle does not merely prick ; it *stings*. This is because the hairs are filled with an acid which gets under our skin, through the hole made by the point of the hair. This makes our skin uncomfortable. *Formis* is Latin for an ant, and this acid is called formic acid because it is found in the bodies of ants. There it probably prevents other animals from eating the ants, because it is not nice to taste. This is one of the thousands of ways in which animals and plants are protected from their enemies—like the poisoned tooth of the serpent and the unpleasant and often poisonous oils found in the leaves of certain plants like the tobacco plant.

How Does the Speedometer Work?

The two types of speedometer most commonly used are the Centrifugal and the Chronometric. The first is a simple arrangement based on the fact that rotating weights tend to fly outward. Details of its working are shown on page 62.

The Chronometric speedometer is rather more complicated. It may be said to consist of four sets of mechanism in one. There are two distance-recording drums and the way they work is described on page 63. The speed-recording mechanism consists of a series of wheels engaging with one another to indicate the speed ; and an escapement and camshaft control the periods during which the speed-recording apparatus is to work.

The Geared Spindle turns the Integrator Wheel for a quarter of a second and then is out of engagement for half a second. Clearly the integrator wheel will be turned farther at 60 miles an hour than at 10 miles.

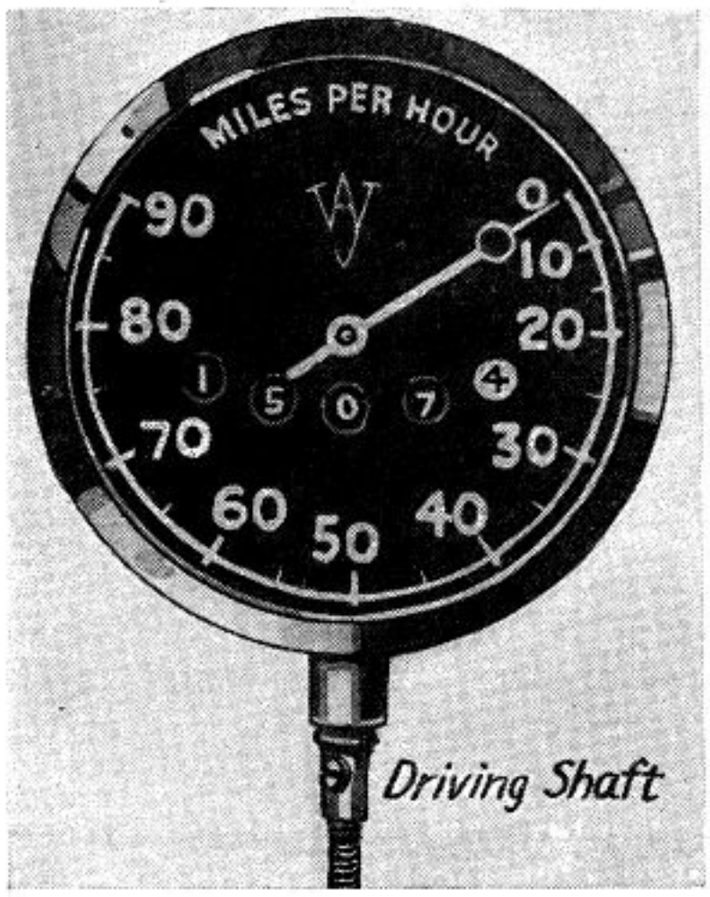
A peg on the integrator pushes forward a peg on the Recorder Wheel, turning it an equal amount, and this movement is passed to the Stabiliser Wheel to which the pointer is fixed.

The integrator and recorder wheels are locked by flat Control Springs and are held until the Camshaft releases them, when coiled springs pull them back to zero.

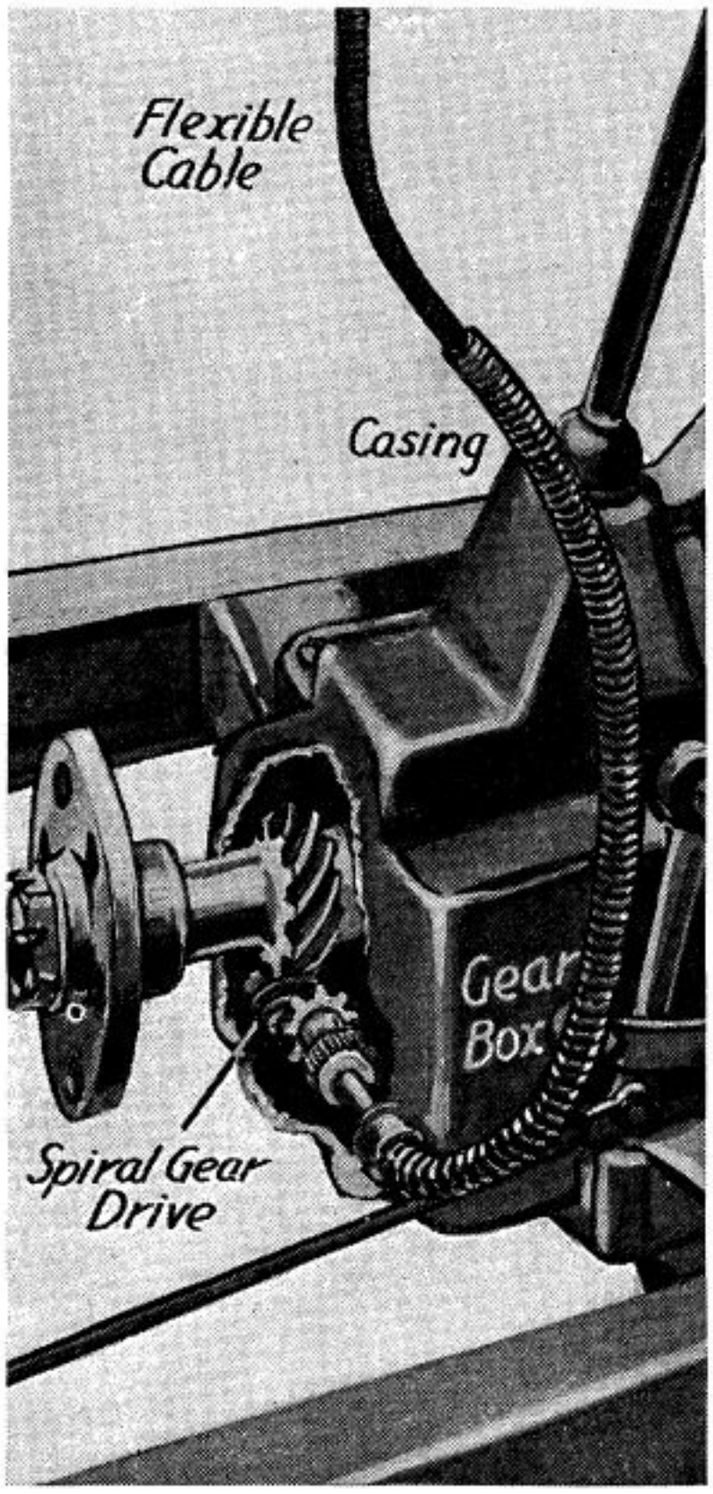
Now the car starts off. The geared spindle engages, carrying the integrator and recorder wheels forward. This movement is transferred to the stabiliser and pointer. The camshaft then lifts the integrator control spring, and that wheel flies back to zero, ready for the next engagement of the geared spindle. The recorder wheel does not drop back yet.

If the car is moving slower, the integrator is not moved quite so far next time ; the camshaft releases the control spring of the recorder, and its coiled spring pulls it back to the integrator peg where it is stopped. If the car's speed had increased, however, the shape of the

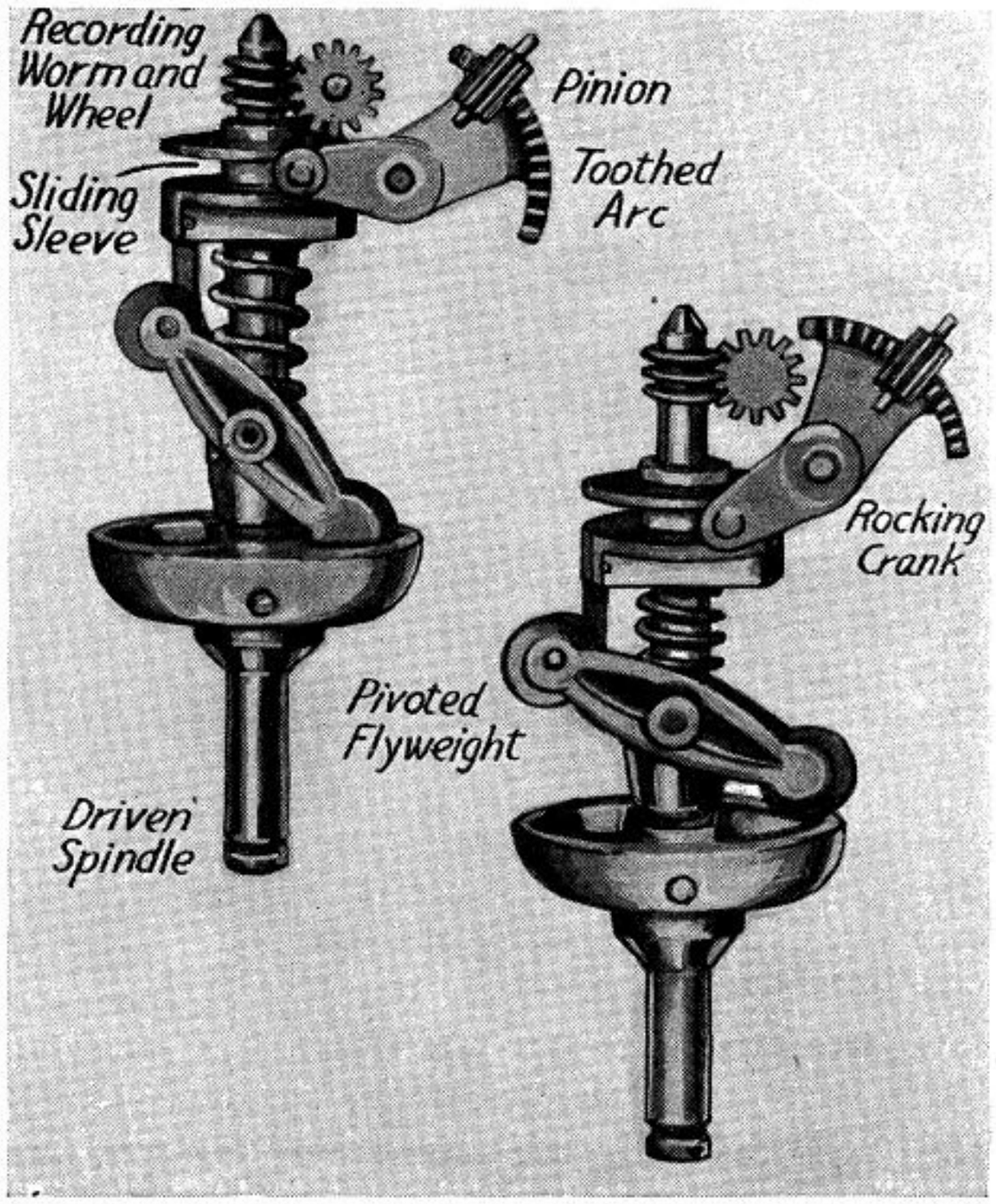
HOW A CENTRIFUGAL SPEEDOMETER WORKS



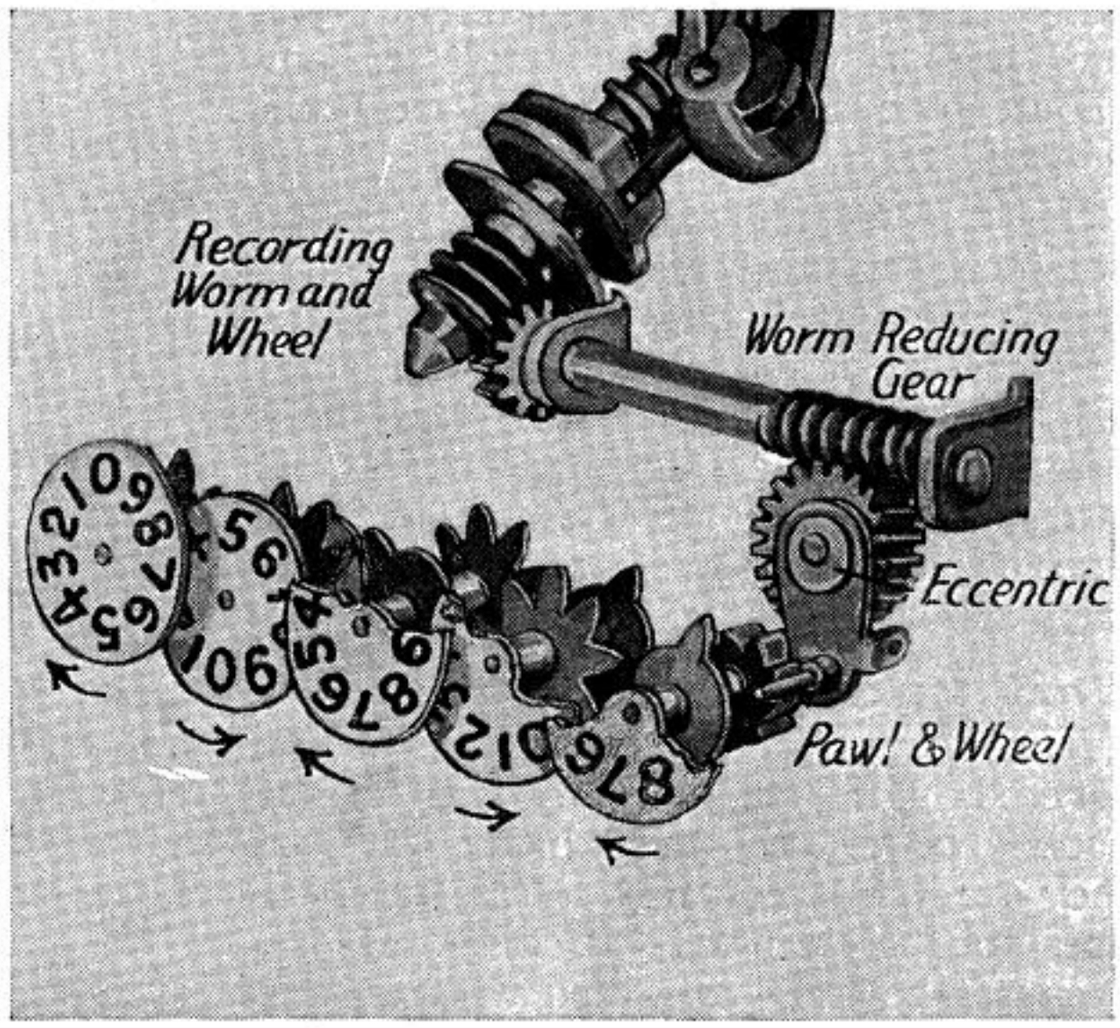
1. Here is a speedometer of the Centrifugal type registering speeds up to 90 miles an hour. It also records the distance run in miles and tenths of a mile. Usually a speedometer of this kind has a dome-shaped casing at the back, and the driving shaft enters obliquely.



2. Every modern car has a speedometer drive in its gear-box, and this picture shows how it may be arranged. The shaft which passes the engine power to the back axle may have a little spirally-toothed gear-wheel, meshing with another. To this second gear a long flexible cable is attached, and this, in a metal casing, takes the drive up to the speedometer.

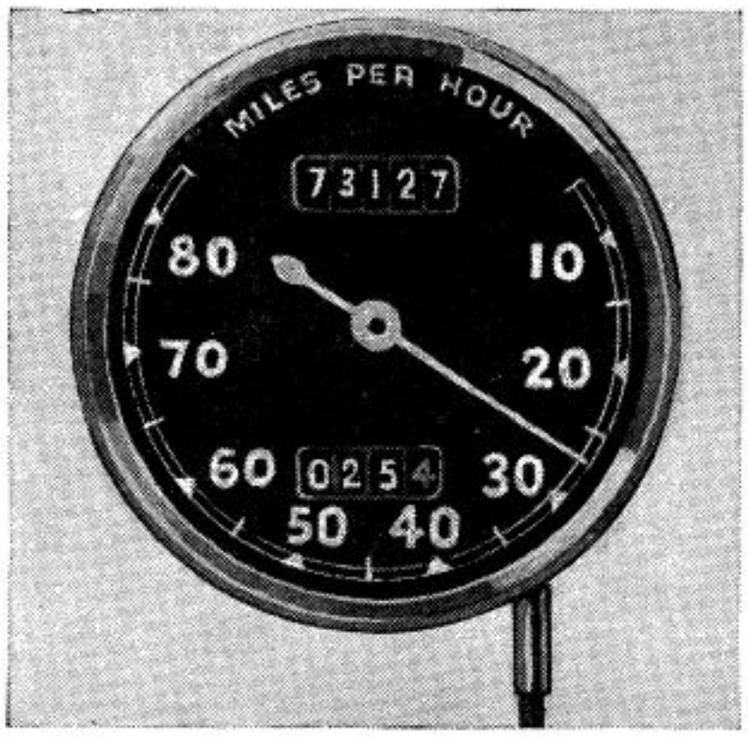


3. Here are shown the principal working parts of the speedometer at rest and in motion. The flexible cable drives the spindle, and on it is pivoted a double flyweight. Linked to this is a sliding sleeve. The weights fly outward when they turn and the sleeve is drawn down against the spring on the spindle. Thus the rocking crank is moved and the toothed arc at its other end turns a pinion on which the pointer is fixed.

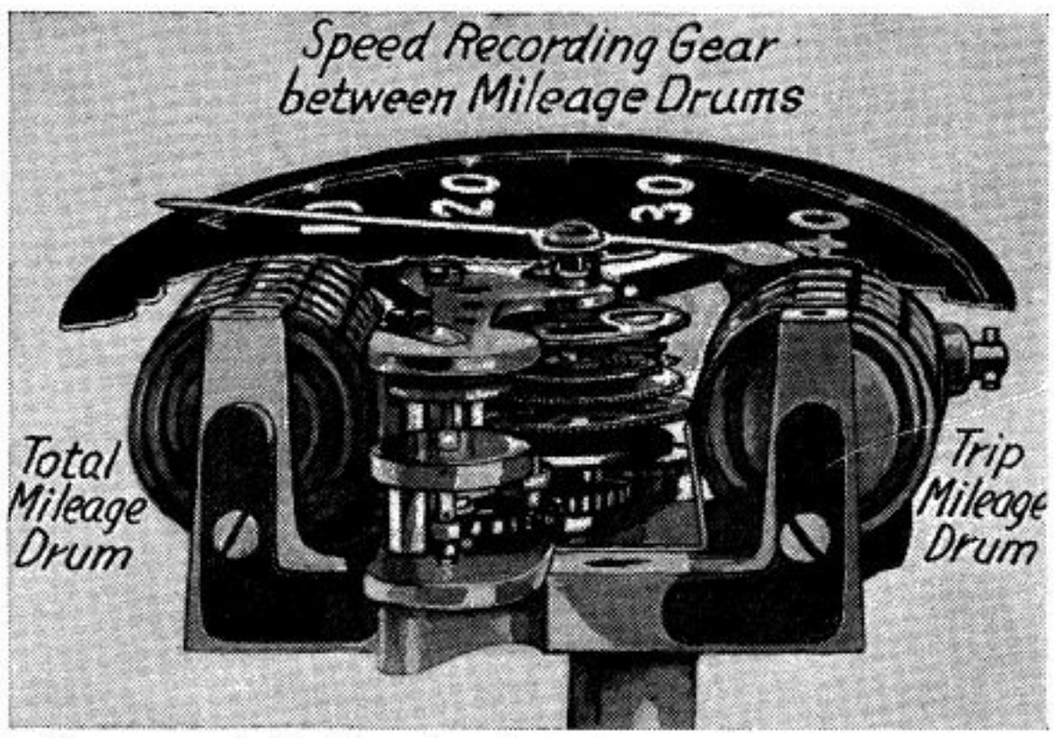


4. Here is the recording gear. A worm on the spindle turns a worm-reducing gear so that an eccentric makes one turn in a tenth of a mile. Each time the eccentric makes a downward push the pawl moves a ratchet wheel and brings the next figure up to the little window where tenths of a mile are shown. After nine figures have passed the single-toothed wheel will next move on one tooth the ten-toothed wheel next to it, which indicates miles. When this second disc has made a complete revolution, after ten miles, it moves on the next by one tooth, and so on.

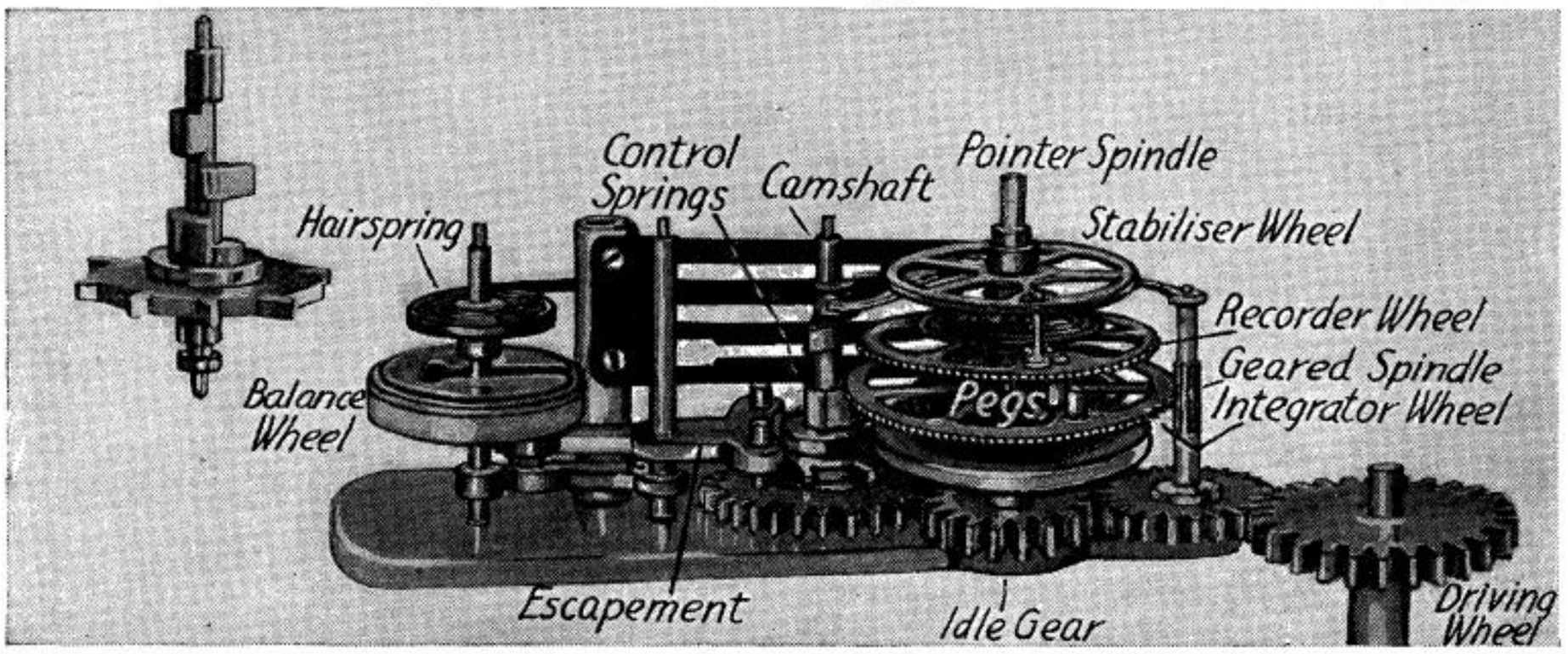
INSIDE THE CHRONOMETRIC SPEEDOMETER



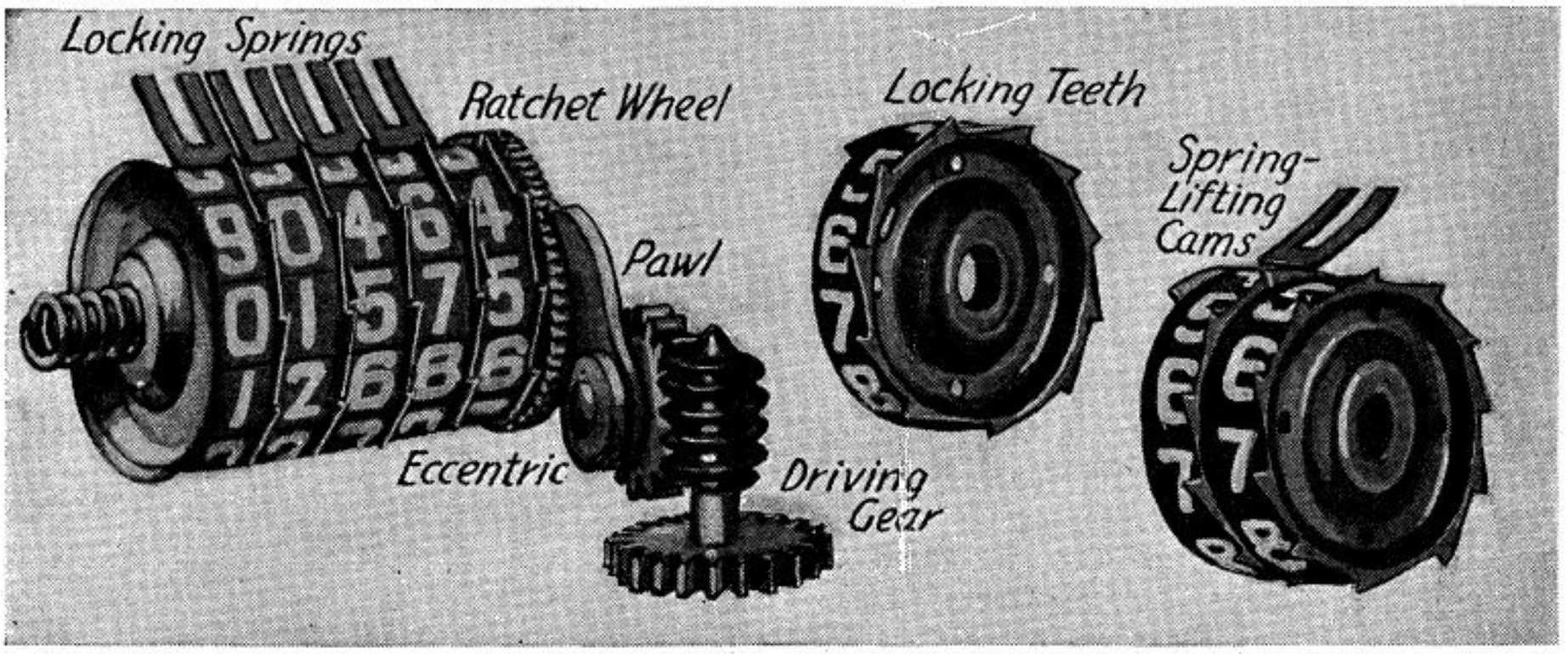
1. This speedometer is of a different type altogether, known as Chronometric. It is based on a clock movement, driven from the gear-box as before. The distance-recording gives us two sets of figures, one for the trip just made and one for the increasing total.



2. Here we see inside the casing of the chronometric speedometer with the dial face half broken away to show how the parts are arranged. On the right of the trip mileage drum, which also records tenths of a mile, can be seen the connection for setting the trip back to zero, which can be done without interfering with the total mileage. The speed-recording gear is the mechanism in between the two drums.



3. Here is an enlarged view of the speed-recording mechanism and, on the left, the camshaft is shown removed. Notice the train of four gear-wheels. That on the right is driven by the flexible shaft from the gear-box. Next is that which drives the geared spindle, and following this is an idle gear. This is not connected to the spindle running through the column of wheels above it. The gear on the left is the camshaft drive, but it is not fixed to the camshaft, driving it by way of a spring clutch. This camshaft is the master of the mechanism, operating the control springs; it can only make one revolution every three-quarters of a second. The balance-wheel and escapement ensure this, as described on page 64.



4. The working of the distance-recording gear is shown here, on the left being the complete assembly, the five drums, each similar to that shown in the centre, being squeezed together by a spring. The eccentric and pawl step the right-hand drum round one turn in ten miles. The locking-teeth on the right edge of the next drum are held by the locking springs until one complete turn has been made by the right-hand drum. Then the spring-lifting cam on the right-hand drum levers up the spring and allows one tooth of the next drum to the left to move up. The same thing happens when the second drum has made one complete turn, and so on until 99,999 is registered, when all go back to zero again.

recorder wheels, teeth would have allowed it to be pushed onward.

A gearwheel drives the camshaft through a slipping spring clutch, and whatever the speed of this gearwheel the camshaft, controlled by the balance wheel and an escapement of clock type, cannot turn at more than 80 revolutions a minute or one in three-quarters of a second.

The top cam on the camshaft engages the geared spindle with the integrator wheel, and the two lower cams lift the flat control springs as required, releasing recorder and integrator wheels in turn.

What Wakes Me Up in the Morning?

In order to understand this we must realise that we do not sleep in just the same way all through the night. To begin with, we sleep deeply. Now, it is good to sleep deeply. It makes us look well and beautiful.

But for some hours after this we sleep less and less deeply. We can easily find this out by noticing exactly how loud a noise is required to wake anybody up at various times in his sleep. And we find that when he has had nearly enough sleep he will be wakened by a noise which, a few hours before, he would not have noticed.

That is the sort of thing that happens when we wake. We have been sleeping less and less deeply for some time, and our brain has almost awakened of itself. Then there comes a sound or a light, or perhaps we move in bed and feel ourselves moving, and since we are already very nearly awake the sound or the light or the feeling wakes us up. Of course, we live in a way that we have made for ourselves ; but if we lived out of doors, as men did long ago, and as birds do still, it would naturally be light that woke us up at last. That is what wakes the birds up now, though we are awakened by a noise.

Why Does a Tree Grow Upward?

The first thing to say in answering this question is that the whole tree does not grow up. Part of the tree grows downward, and that is the root. Each grows to the place where it can do the work for which it was made. In the seed from which the tree grows there are certain cells which are meant to form the part of the tree that is to live in the air and the light. Wherever the light is, they grow toward it. On the other hand, there are other cells which grow best in the dark, and which even seem to be affected by the gravitation of the Earth, so that they grow best toward the centre of the Earth.

It is possible to play tricks with the seed, as, for instance, to turn it upside down ; but the rule is that the plant will do its best by curling round as it grows, to ensure that the *shoots* shall get into the air and the light, and the *roots* shall grow downward. So the tree—and this is true of nearly all plants—has two parts : one that lives in the air and one that lives in the soil. Neither part could live without the other, and the tree is so made from the first that the right part of it, that which is capable of making leaves, must grow upward into the light and air ; while that part of it which will be capable of sucking up water and salts, and also of holding firm, must grow downward into the earth.

Why Is It Dark at Night?

If you take a ball and hold it near a bright light, said the Wise Man, the half of the ball next to the light is shone upon, and the half of the ball away from the light is dark. If you mark a spot on the ball, and then turn the ball round and round like a top, that spot will be shone upon half the time and will be in the dark the other half of the time. We live on a big ball called the Earth, which is always spinning round and round, and it is shone upon all the time, day and night, by the bright light called the Sun.

The place where we live is like the spot on the ball, and, as the great Earth-ball spins, part of the time we are on the side next to the Sun and part of the time we are on the side away from the Sun. When we are on that side it is dark at night, but while it is our night it is day-time for the people who live on the other side of the ball. However dark it is where we live, the Sun is always shining somewhere, and the Earth is always travelling toward it or away from it. The Sun does not come to the Earth, but the Earth comes into the sunlight. If you think of the ball and the light you will understand that, however dark it is, the Earth will soon carry us round into the light again. Have you ever heard one of the most beautiful lines in all poetry : " There is a budding morrow in midnight," meaning that every night a day is being born ?

The Story of the Beautiful Things in the Treasure-House of the World

What This Story Tells Us

WHO shall count the treasures of the world that men have made—the lovely things that have come down to us through the ages? Nature has filled the Earth with beauty, and in the dark hours of the world it is good to remember that spring and summer have never failed to come, that the violet and the daffodil have never failed to bloom, that June will bring red roses and lift up the hearts of men. And man, too, has made a glory in the world not unworthy to compare with Nature in her glory. It is good to think of all the heritage of art that comes to every child alive, of the gems that pack our museums, the glory that enriches our great galleries, the old cathedrals that stand to witness to the faith that man has never lost in his Creator. Here we shall read of the most beautiful things that men have made—pictures and statues and buildings from all ages and all lands.

THE RICH TREASURE THAT IS OURS

THE art of the world is a glorious inheritance of which we can never be too proud, and it is our very own.

The great pictures of a nation may hang on the walls of public galleries, but every time we go and look at them it is as if we stamped them with our own names. They thus become our private collection—a treasure house of lovely things that time cannot wither nor custom make stale. And, by a beautiful magic, the more miserly we are, the more we gloat upon our treasures and count them over, the richer we become.

There is something extravagant in the world's showering of these gifts upon us, the children of a hardworking and meagre day. It is not only in our galleries and museums, in great paintings and sculptures, that we find things to gladden our eye. Art is with us everywhere. We can scarcely walk by a bookseller's shop, or a pottery store, or a jeweller's window, without being face to face with something we owe to the art of the past.

It may be a picture painted and reproduced yesterday, an enamel or china bowl fresh from the maker's hands, but its beginnings lie in the remote civilisations of the world. It may be a beautiful doorway or a pedestal of modern construction, but the first stone was laid many thousands of years before Jesus was born. The art of today is the inherited sense in large or small degree of the art of all time.

MICHAEL ANGELO

So that our treasure, our inheritance, is twofold. For centuries upon centuries the nations of the earth have been creating and storing up lovely shapes and colours that are our joy today. These are a historic possession. And every year that passes, beautiful things are made which owe their origin consciously or unconsciously to this historic possession; and in these we are again enriched. In art, more than in any other province of the world's history, we are indeed the heirs of all the ages.

Surrounded as we are by innumerable expressions of art, we are apt sometimes to confuse an inspired picture with its imitations, and to take for great what is only cleverly shoddy. We need some standard by which to set our judgment, and we find sooner or later that the Old Masters are the best of all teachers.

A picture or a statue is not necessarily good because it is old. A great deal of ancient art is mainly treasured because it is a living emblem of a dead civilisation, and acts as illustrations to the book of days of an extinct race. But there are certain paintings and sculptures which can be taken as great art, the work of the loftiest genius the world has known, and they owe their proud place, not merely to their antiquity, but to the judgment and verdict of history.

THE THREE CHIEF CLASSES OF THE GREAT ART OF THE WORLD

In the minds of some people there is at first an unwillingness to take the opinion of another, even of generations of men. And often, if some of us were courageous and sincere, we should confess that we preferred Miss Maud Goodman's pretty little pictures to the paintings of a Titian or a Botticelli. This is, perhaps, because we have never had an opportunity of studying art seriously enough. It takes two to make a picture, one to paint it and the other to look at it. A great picture is the subject the artist painted plus the secret he painted into it. Until we understand something of that secret we cannot fully appreciate our magnificent inheritance.

The great art of the world—the art which has passed the ordeal of centuries of criticism—falls into three chief classes: painting, sculpture, and architecture. Architecture, indeed, may be called the parent of all art, because for a long time pictures were only made to decorate spaces on walls, and they were painted on the fabric of the building itself; the framed picture is a comparatively modern adaptation of the coloured wall-panel. And statues were chiselled to adorn niches in temples and palaces, or cut in low relief, to make a long fresco pattern.

THE LOVE THAT INSPIRED THE WORLD'S GREAT PICTURES

Whatever it may be, sculpture, painting, or architecture, this work of the Old Masters has a kind of family resemblance in that it owes its birth to an instinct common to its kindred. In almost every case it was inspired by one of the great emotions of the human heart—love, sorrow, reverence, or worship, and without some such feeling no great art is ever conceived.

Love has inspired more pictures than any other human emotion, but love bears a very wide interpretation. There is physical love—the love of husband, wife, or child; love of the mind—the love of abstract qualities, such as truth, courage; spiritual love—the love of God and of the earth, which poets call the garment of God. The pictures inspired by sorrow are fewer, but move more intensely, because the tragedy of life is that death stalks our beloved, and sooner or later hurls his dart.

Love, sorrow, worship; and in a way the greatest of these is worship and holds in itself all three. Worship painted pictures, carved statues, built temples and cathedrals, and made them greater than man because they held a sense of God-head, of eternity enclosing time as the universe encloses the Earth.

If we think seriously of any picture the world calls great, we shall see that its subject is one of these powerful emotions; and any work so conceived, if poorly executed, has in it the seeds of greatness because it strikes at the heart of the human race. This basic feeling, however, is, so to speak, the foundation, the scaffolding, and not the finished edifice. It is the subject the artist painted minus the secret he painted into it, which some of us spend our lives trying to discover. The secret was his own imagination and sense of beauty, and therein lay his final and unapproachable greatness.

THE FEELINGS OF THE SOUL THAT ARE PERFECTLY REAL

We ask what is beauty, what is imagination, and no one can find an answer. We know where beauty and imagination are revealed, in form and colour which satisfy the soul as food satisfies the body; but their nature is hidden deep in the mystery of life. We can think of them as senses of the spirit, as real as are the physical senses of sight, hearing, touch, taste and smell. Just as our ears record the sound of a piece of music, and our eyes register an impression of the shape of a piece of stone, so these spirit-senses "feel" the vision of perfect sound that makes the music beautiful, the vision of perfect contour that makes the stone a lovely statue.

Beauty and imagination reach out beyond the actual to the ideal. For instance, thousands of artists have drawn portraits of old women. Rembrandt drew the portrait of an old woman, and it is one of the greatest things in the world, because, having his sense of sight, he recorded the features, by his sense of beauty and imagination he recorded something

infinitely wonderful: not the face of one old woman, but the lovableness, the dignity, sorrow and other-worldliness of old age of all time.

Hundreds of men have painted landscapes and got on to their canvases the glow of the sun and the radiance of the sea. Turner painted that same glowing sun, that same radiant sea, but his sense of beauty, his imagination, reached out to an intangible, heavenly glory, and so he put into his pictures " the light that never was, on land or sea, the consecration, and the poet's dream."

THE SPIRIT THAT BUILT THE PARTHENON AND WROTE SHAKESPEARE'S TALES

These spirit-senses of beauty and imagination are powers which the human soul has developed through thousands of years of effort to express itself. All art, poetry, and music, are forms of self-expression. Next to bodily needs, such as food, shelter, clothing, the need of self-expression is one of the most powerful of human instincts.

Every man, save the few in a generation who are born spiritually slothful, is moved by it to the doing of certain kinds of work on which he can stamp his own individuality. It is that which makes a child set up an erection of sand with patience and care, and then say, " *I* have made a house." It is that which built the Parthenon and wrote The Winter's Tale and composed the " Pathetic " Sonata. We are told by Indian mystics that it was because of God's desire to express Himself that He created the world—flung from Him a whirling atom, and on that atom, grown huge and populous, we live and are trying to express the beautiful, which, in the ultimate, is God.

THE GREAT HUNGER OF MEN TO EXPRESS THEMSELVES

Art is the very earliest form of this self-expression. Before men could read or write, while yet their clothing was the skins of animals, they could draw. They rendered the objects about them in the simple way a little one would draw its pet kitten on a slate today. They drew in their idle moments, when the chase was over and the food broiled and eaten by the cave fire. Between those early efforts and the art which today is a lofty vocation there is a great gulf fixed. Thousands of years are needed to span the gulf, and during that time, as whole civilisations rose to power and died, the craving to express himself in beautiful imagery became a spiritual hunger in man's heart.

To look back on the art of the world is, in a way, to see the story of the growing pains of this aesthetic life which is now our pride and exceeding great joy. The early art of the world was centred round the several religions of the human race, and for a long time the sense of beauty was small and stunted and responded to false ideals. Imagination went astray, and the gods men portrayed in their sculpture as high above humans were often decorated puppets.

But while his soul was thus struggling in the half-light, man's power of self-expression was becoming great. With each passing century art became more ennobled, more purified of excess, and grew to be a very real part of the life of a nation. And soon it came to pass that men were born whose sense of beauty and imagination were so powerful as to override all other instincts. They were the men we call geniuses, in whom the inward urge for self-expression in lovely imagery became a driving force that cut a wedge, so to speak, through the history of their day.

NATIONS THAT FEEL DEEPLY, AND NATIONS BLIND AND DEAF

To these gifted ones art mattered more than food or clothing; they spent their lives working out their ideals of purity in line and colour, their spiritual conceptions, in a word, their secrets, which they wrought into their painting and sculpture. But nations, like men, are different one from another; some races have been sensitive to beautiful impressions, and others have been blind and deaf.

The spirit of beauty and imagination filled one people as one man—the Greeks. The soul of Greece was loveliness, pagan loveliness, and there has never been another nation to whom art was so vital.

Even in Greece there were generations of immaturity. A sense of pure beauty only comes to a race in its flowering time; when the soul of a people withers and falls asunder the art it expresses becomes depraved and false. Nature is chary of perfection. It is, perhaps, because artists have always dreamed of a realisation of perfect beauty that genius is called the sorrowful gift, always urging the soul to express the inexpressible, to attain the unattainable. It was the pent-up spirit of an artist who cried:

"Oh beauty, oh divine, white wonder,
On whom my dull eyes, blind to all else,
peer."

But it is not only artists who yearn for the vision beautiful. Almost every man, woman, and child has inherited, in however slight degree, the instinct which is the beginning of art. And therein, as soon as we realise it, lies a wonderful happiness. It is because we have in our own souls—we who have never painted a picture or carved a statue—a latent sense of beauty and imagination that we are moved by great art, that we stand spellbound before a picture and go away haunted by its lines and colours. It is not necessary for us to understand the subject of the picture. We see something beautiful and it calls to something beautiful in us.

WE ARE ALL DESCENDED FROM THE GENIUSES OF THE WORLD

We are all, in a way, descended from the geniuses of the world, and the longer we live, the more we cultivate our sense of beauty, the more shall we show the marks of our breeding. There is scarcely a child born into the world who carries not in himself the seeds of greatness. And the reason the greatness so rarely flowers is due to the accident of circumstance, upbringing, environment. So that we are in the position of knowing in our inmost souls what beautiful sound is, and being unable to express it in music; of realising dimly what colour is, and of being helpless when someone offers us a palette and a canvas.

Art says for us the things we cannot say for ourselves. And, in the measure that we allow our aesthetic sense to grow, we realise that it is not only in the actual rendering of concrete shape and colour that artists are our spokesmen. Art makes articulate the dumb emotions of the soul.

Great happiness or great sorrow seals our lips and keeps us dumb, but as we look on great pictures and sculptures we find that happiness and that sorrow portrayed for ever by someone who had the power to speak it out.

ART RUNS THROUGH THE WHOLE WORLD OF THOUGHT AND FEELING

As in a greater degree, so in a lesser one, we owe to lovely things the expression of ourselves. There is not a province of thought or feeling that art does not reveal. It is as if beauty and imagination, like pagan goddesses, immeasurable in their power, had thrown over the world a finely meshed net, and caught all the outward-flying fragments of human aspirations and held them for ever in a golden web. And so we come to see that great statues and pictures are more than lovely shapes and colours: they are beautiful dreams come true, heavenly visions crystallised in stone. They are the sum of all that is best in the mind and heart and soul of the human race. They are a fragment of bygone time and yet a piece of today and tomorrow. They are the tremendous fulfilment of all the small longings of the individual soul, the ideals and hopes that flit to and fro in the chambers of the mind, the loveliness we yearn for and may not possess. The spirit senses of beauty and imagination have seized once and for all the fleeting rapture of daily life, the dawns that are full of little angels' wings, the sunsets that are full of spring flowers, the hours when earth is very near to heaven.

And we may be quite sure that a picture which does not react on our own imagination, which does not make us conscious of other qualities than colour and shape—of the artist's secret, in fact—is not great. It may be a pleasant and attractive subject, but if it ends in itself it will die. It is the secret of art for ever to tantalise us with its secret.

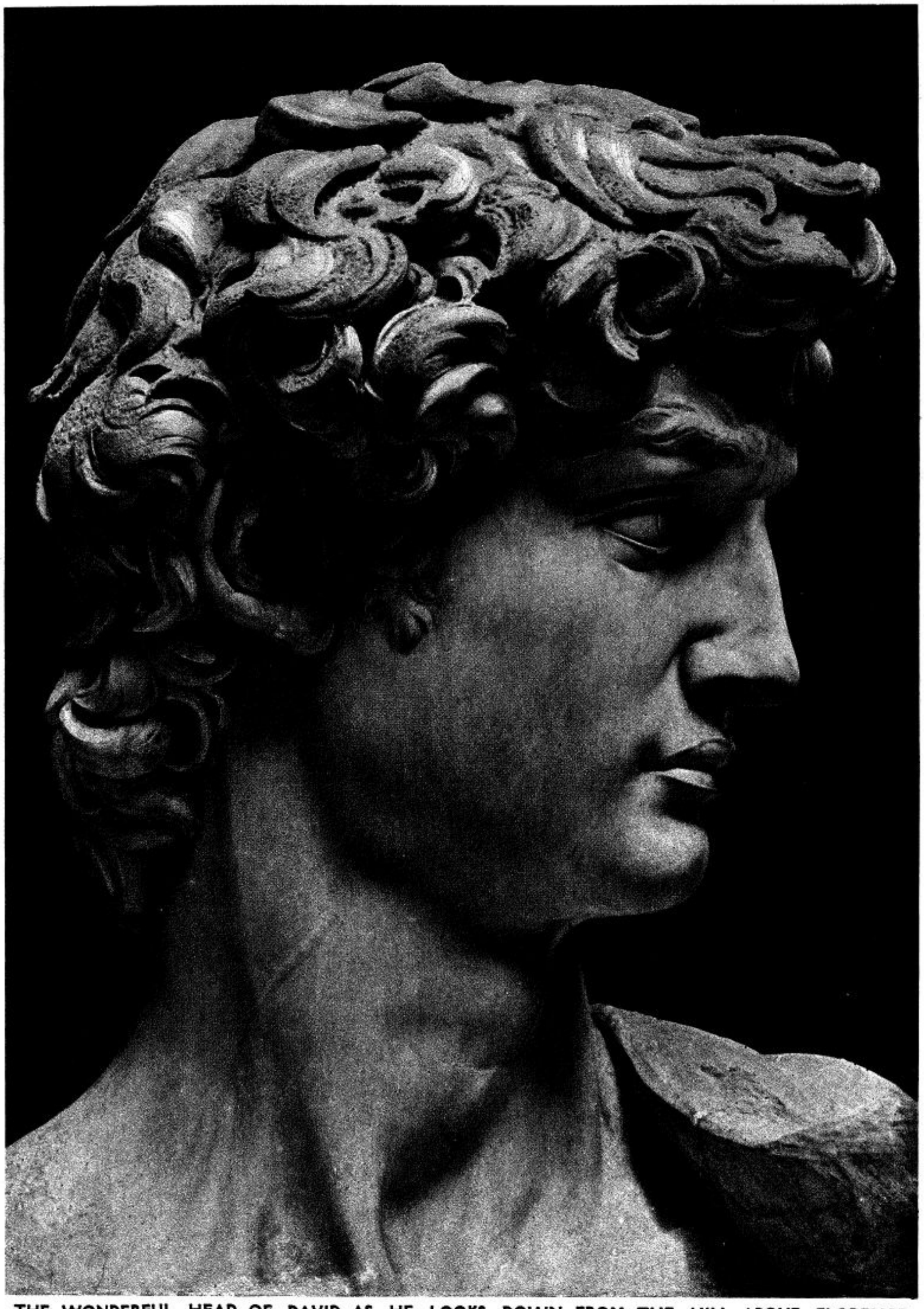
THE THRILL OF THE FIRST MAN WHO DREW A BEAUTIFUL THING

For all our knowledge of the presence of art as a living force in the world for some sixteen thousand years, it is still as mysterious a presence as it was in the consciousness of the first man who drew a beautiful thing and thrilled with the thought, "*I* have done that." Art has become in a way a great science, whereof the handbooks are legion, and yet a fairy tale; a career demanding seasons of hard study and yet dependent on the elusiveness of dreams. And when painters have given their rich years to learning and toil, and have grown great, they are still what the unlearned artists of old were, magicians who make the world a garden.

The work of these inspired ones of yesterday and today lies scattered about the world like flowers which bloom for ever. We cannot think how bare our lives would be, lacking these blossoms. Colour, shape, and line, finely drawn old faces, lovely forms, green fields and tossing seas, are brought within the range of our stay-at-home eyes by means of great art. We should never count an hour wasted that is spent on looking at these treasures and making them our own, for every time our hearts are moved, however faintly, by the sense of beauty, our souls are marching on.

THE EVERLASTING GLORY OF ART

Art, the expression of the love of beauty in the soul of man, is the pride and glory of the world throughout all ages. Here we give a few examples of the treasures men have left behind for all mankind to love. They show Art in many different fields—painting, sculpture, carving, and so on.



THE WONDERFUL HEAD OF DAVID AS HE LOOKS DOWN FROM THE HILL ABOVE FLORENCE WHERE MICHAEL ANGELO PLACED HIM

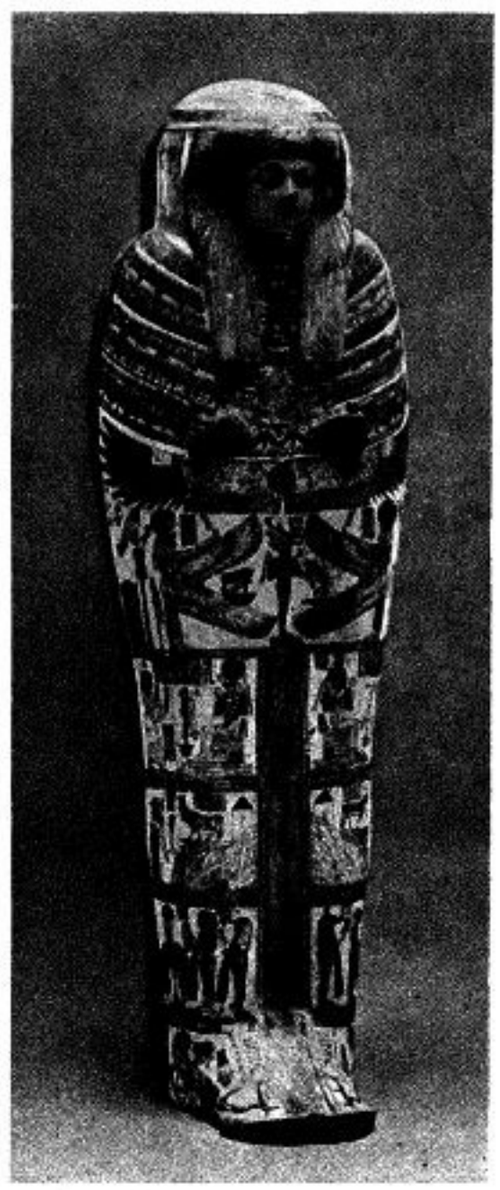
A SILVER MEDAL OF THE SEVENTEENTH CENTURY

BRONZE HEAD FROM HERCULANEUM

A MAJOLICA PLATE FROM ITALY

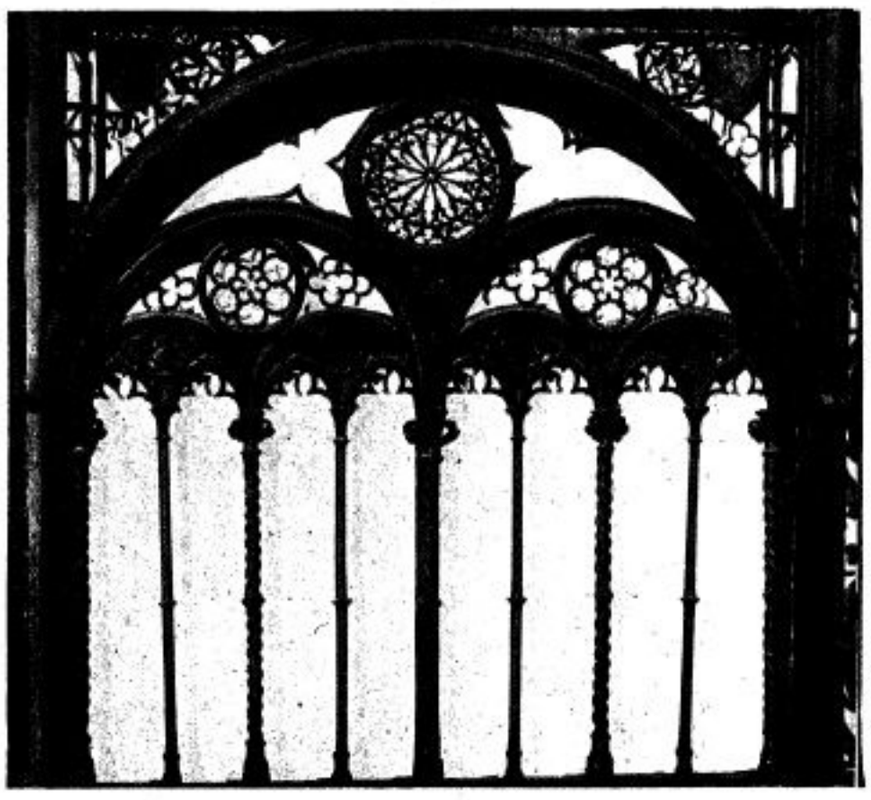
A SIXTH-CENTURY IVORY FROM FLORENCE

A FOURTEENTH-CENTURY CAVALRYMAN

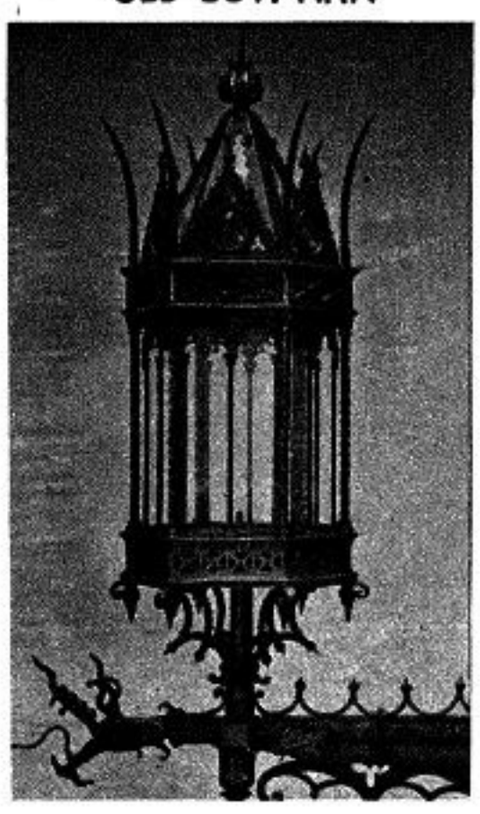


THE COFFIN OF AN OLD EGYPTIAN

AN IVORY PANEL A THOUSAND YEARS OLD

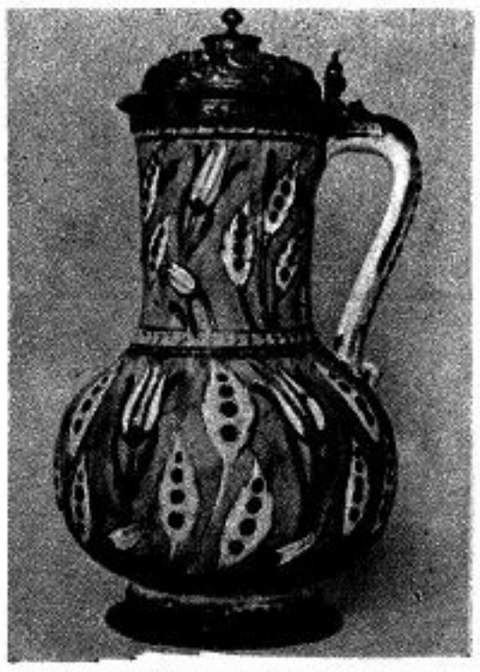


A WROUGHT-IRON WINDOW IN THE CHURCH OF SAINT CROCE, FLORENCE



A RARE LANTERN FROM SIENA

A GOLD MEDAL OF CROMWELL'S MINISTER, JOHN THURLOE



A TURKISH JUG OF THE SIXTEENTH CENTURY

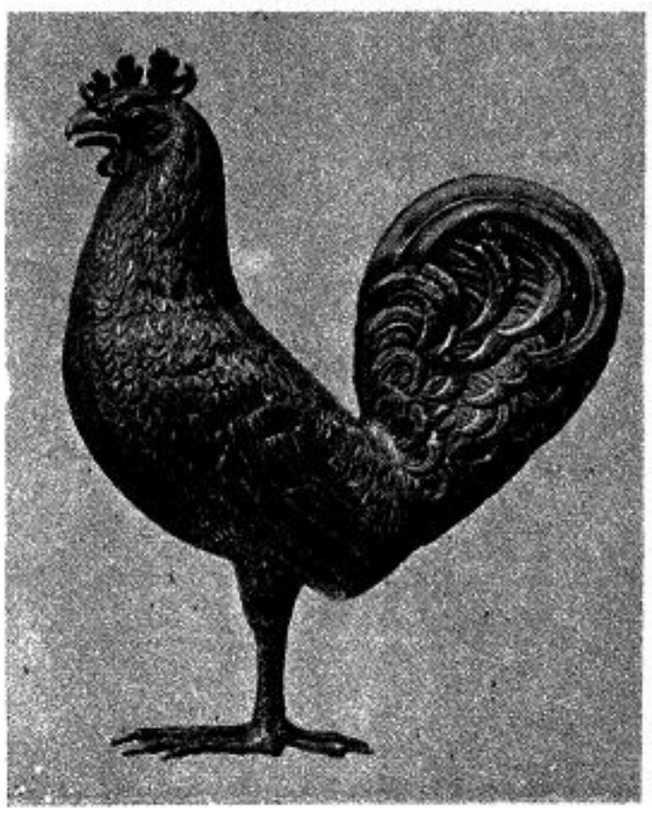
A MEDAL FROM SYRACUSE 25 CENTURIES OLD

A COLUMN IN A PALACE OF FLORENCE

A MINIATURE OF CROMWELL By CHRISTIAN RICHTER

A PERSIAN DOOR IN LACQUER WORK

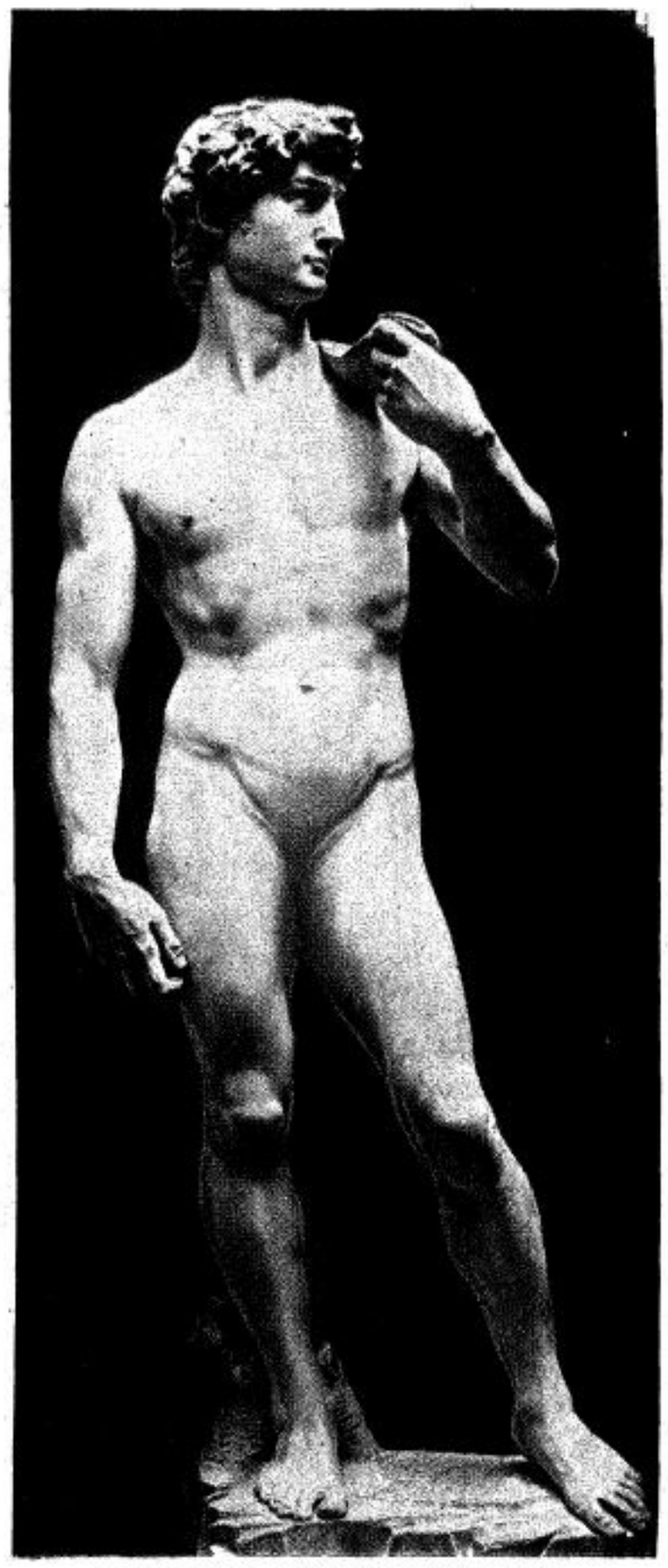
INCENSE-HOLDER FROM THE PITTI PALACE, FLORENCE

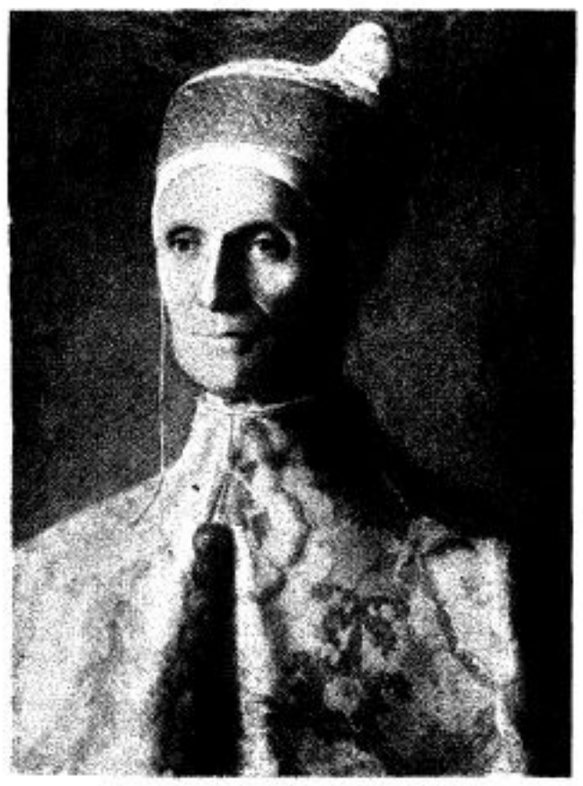


AN OLD GERMAN CUP IN THE FORM OF A COCK

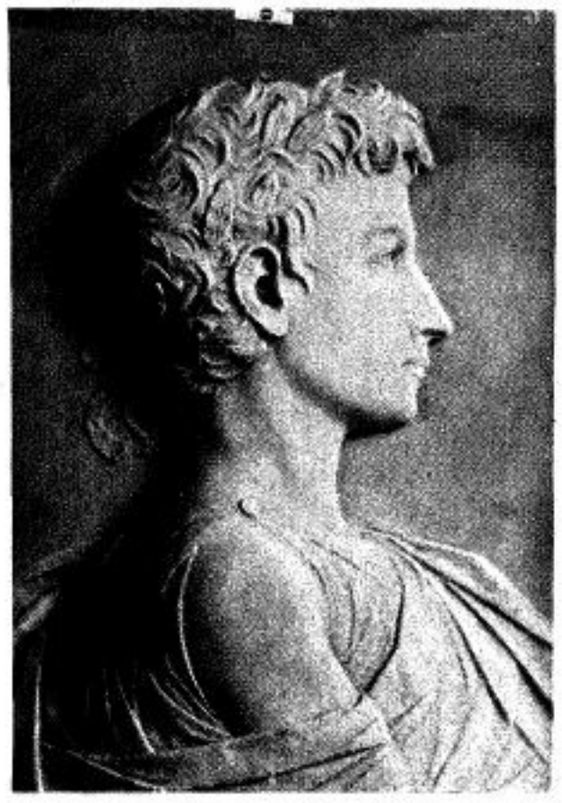
A DECORATED WATER-JUG FROM GREECE

MISS LINLEY & HER BROTHER
By THOMAS GAINSBOROUGH





A DOGE OF VENICE
By GIOVANNI BELLINI



MARCUS AURELIUS

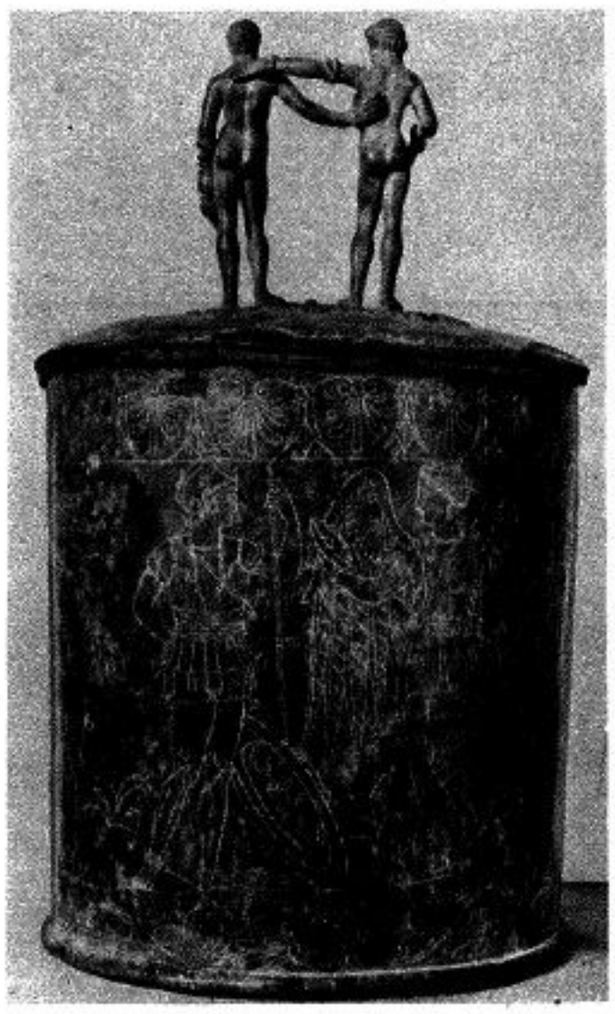
MICHAEL ANGELO'S DAVID

AN OLD LADY By REMBRANDT

MISS BOWLES By SIR JOSHUA REYNOLDS

MISS HAVERFIELD By THOMAS GAINSBOROUGH

A FINE PAINTING BY FRANK HALS OF A NURSE AND CHILD



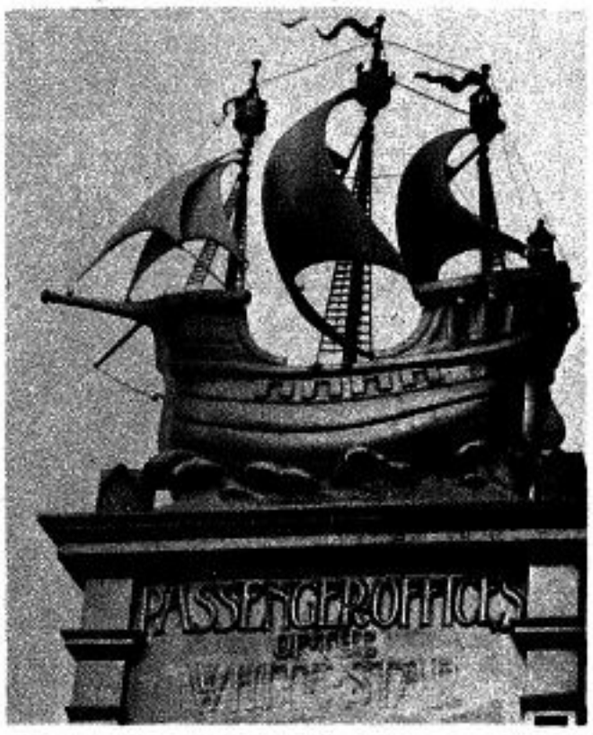
AN ETRUSCAN VESSEL IN BRONZE

AN ANCIENT BRAZIER FROM ITALY

FOOD-CARRIERS OF OLD EGYPT

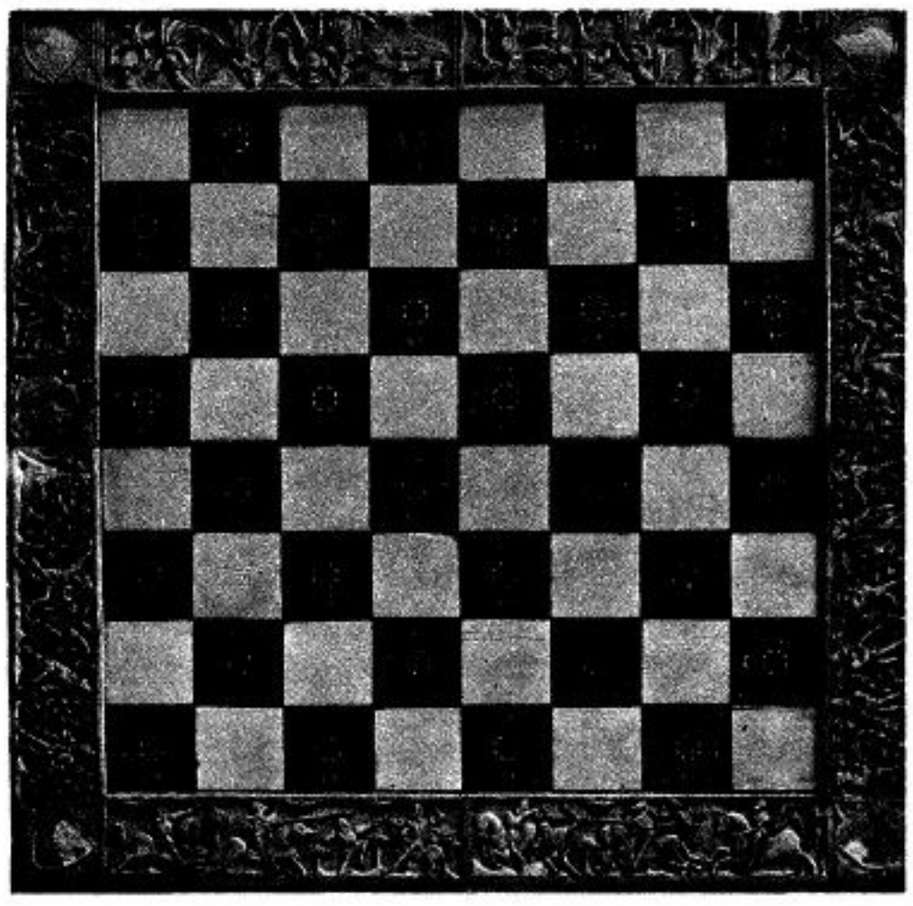
A WOODEN BUST OF THE SIXTEENTH CENTURY

A FOURTH-CENTURY MOSAIC FROM RAVENNA



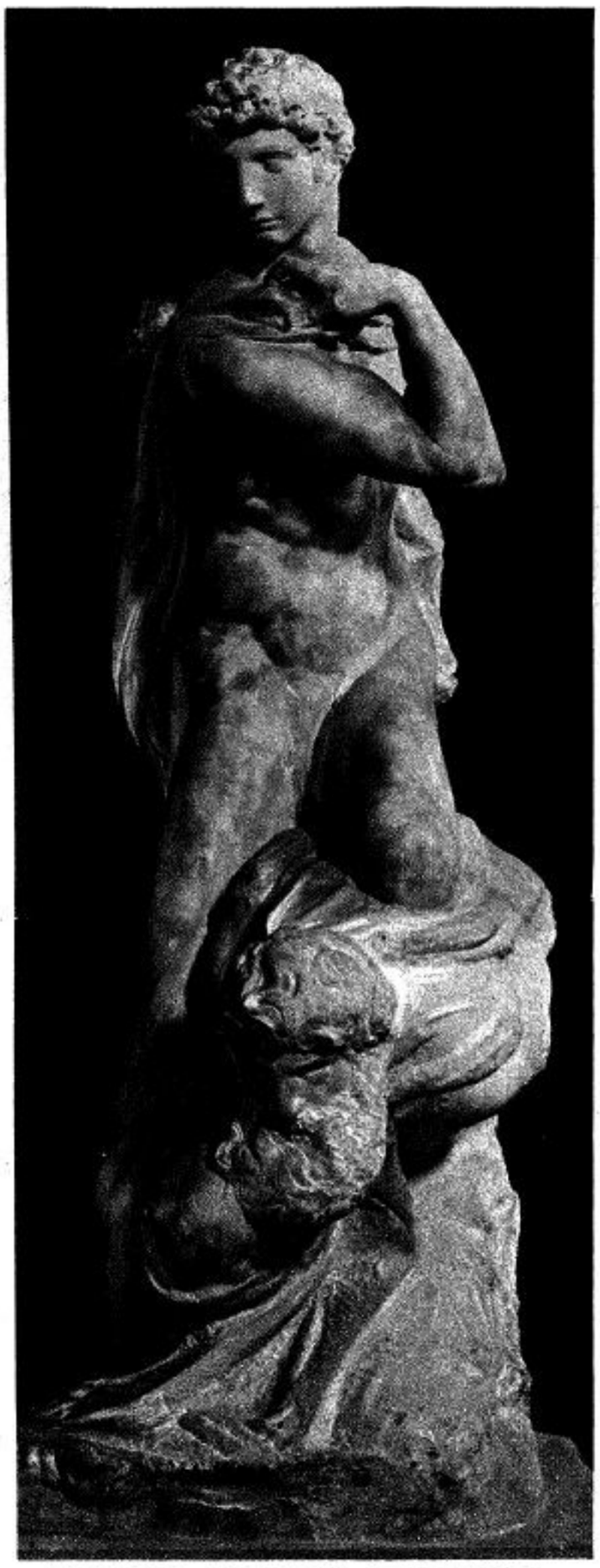
COPPER MODEL OF A SHIP

A BIT OF PAVEMENT FROM FLORENCE 600 YEARS OLD



A CHESSBOARD IN IVORY 400 YEARS OLD FROM THE BARGELLO MUSEUM, FLORENCE

VELASQUEZ'S FERDINAND OF AUSTRIA



MICHAEL ANGELO'S STATUE OF VICTORY IN FLORENCE

A CHINESE GODDESS IN WHITE PORCELAIN

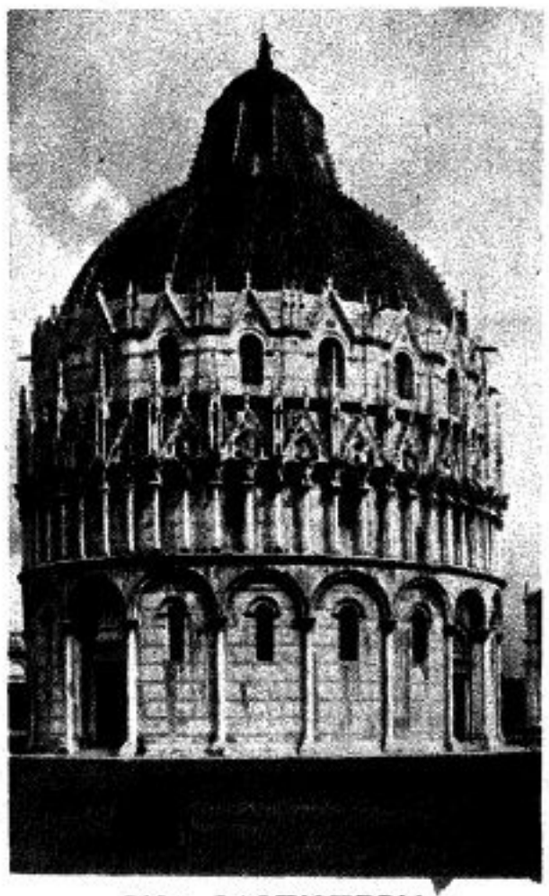
FORTUNA—A SIXTEENTH-CENTURY STATUE

AUGUSTUS CAESAR IN FULL ARMOUR

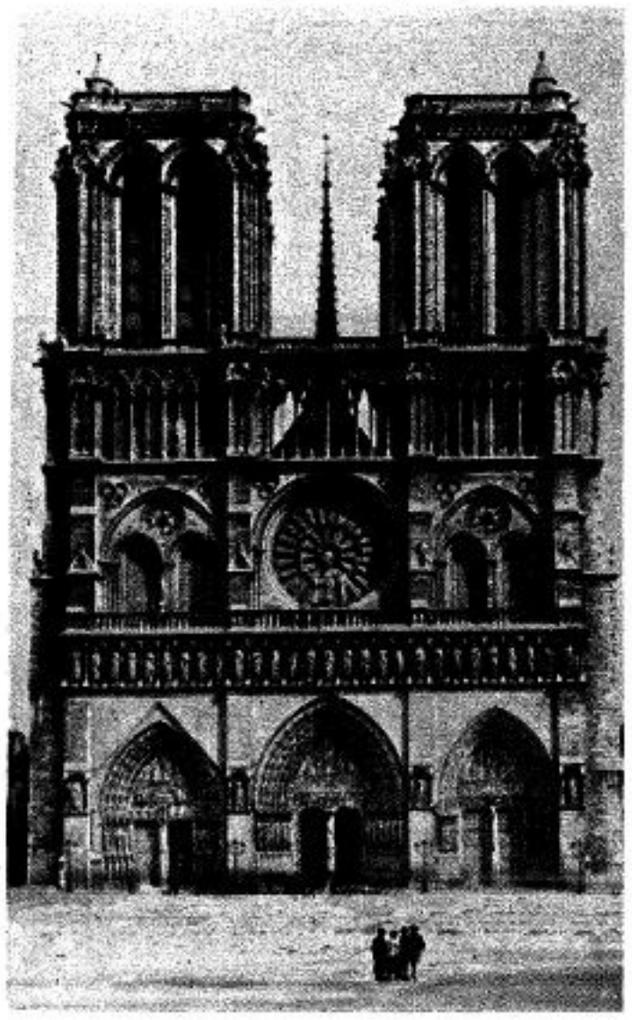
THE ANGELUS By JEAN FRANCOIS MILLET

A STATUE OF NAPOLEON IN A PARIS MUSEUM

SALISBURY CATHEDRAL



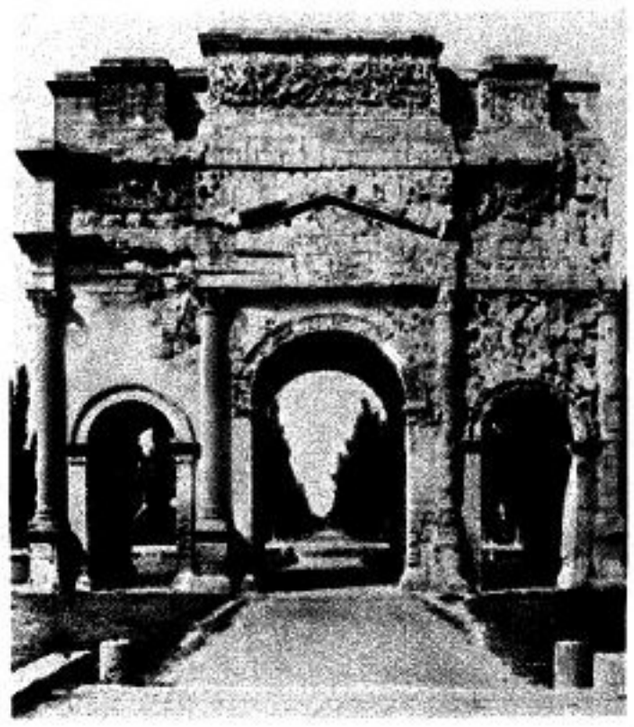
PISA BAPTISTERY



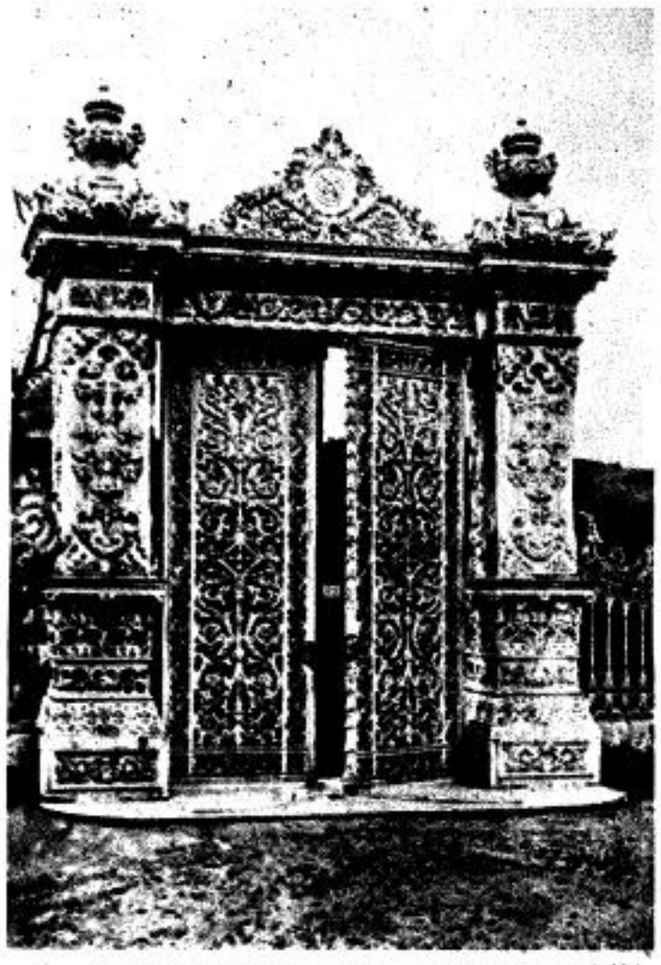
NOTRE DAME, PARIS

ST. GEORGE'S CHAPEL, WINDSOR

A TOWER BUILT BY JULIUS CAESAR IN PROVENCE



ROMAN ARCH AT ORANGE



A BEAUTIFUL OLD GATEWAY IN CONSTANTINOPLE

A 500-YEAR-OLD GATEWAY AT NORWICH

THE CARVED INTERIOR OF AN INDIAN TEMPLE

The Wonderful House We Live In, and Our Place in the World

What This Story Tells Us

HOW Life came into the world no man can tell. Certainly the first living things were plants, and from these all the life we know has come. This part of our book tells us what we know of life, and how it works, and the most marvellous things it has made—the bodies we live in. Fearfully and wonderfully are we made, and perfect and beautiful beyond words is the human frame and all that moves within it. Here we shall read how it works, of the astonishing arrangements which govern our lives, of the delicate balancing of the machinery which secures the perfect working of sight, thought, speech, hearing, breathing, moving; of the complete cooperation and sympathy existing in us all between body, mind, and soul. We shall read here, also, of the lives of those about us, of citizenship, and of our place in society and the world.

LIFE THAT FILLS THE EARTH

LIFE fills the seas, covers the dry land, and flies in the air above. Everywhere there is life and movement and birth and death and new birth; always and everywhere there is life and more life.

These are the most interesting facts of the world we live in, and we must ask many questions concerning them. For instance, what is the difference between a living thing, like a fly, or a rose, or a child, and a thing that is not living or that never has lived, like a stone, or the gravel or clay in the garden?

What are the different kinds of living things? How is it they are so different? An elephant is very different from a piece of moss, yet an elephant is much more like a piece of moss than like a piece of flint. Why is it?

We know that living creatures die, and yet Life does not die; there is no living thing on the Earth now that was alive two thousand years ago, except, perhaps, a few great trees like the cedars of Lebanon. All the living things that were alive then, fishes and flies and birds and flowers, are dead now; yet the Earth never was so filled with life as now.

Why is it? It is because of the very wonderful fact that all living things have children, that these children are like their parents, and that when the parents die the children carry on their lives; and so the world goes round.

There is an old Greek story of the runners who had to carry a flaming torch, and as one runner fell, tired out, he gave the torch to another; and so, though the runners fell and could not reach the goal, the torch was not put out, but went on burning. The torch is like the flame of life, and each living creature is like the runner, handing the flame to the children who will carry it on when he is gone.

Where have all these living things come from? We know that all things, living and dead, have come from God, who sustains them from everlasting to everlasting, but how did all these kinds of living things come into existence? What is their history? Who were their parents? It is well for us that we have been born in the days when this truth and so many others are becoming known, for the more truth we know the better it is for our lives.

Let us begin by asking ourselves how we can tell whether a thing is alive or not alive. Now, that is really silly, you may say, because anyone can tell in a moment that the fly is alive and that the

window-pane is not alive. We know that the fly is alive, just as we know that a boy is alive, because he is so lively. We call anything alive that moves about itself, anything that jumps, or shouts, or swims, or flies. We say this, but is it true ?

Really it is not true. When we come to think of it, the boy is still alive even when he is asleep. He is just as alive when asleep as he was when he was playing before he went to bed. Some wise child may say this is not a good argument at all, for even when the boy is asleep he still moves, for we can see him breathing.

A BIRD'S-EYE VIEW OF THE WORLD ABOUT US

That is true. The heart has not gone to sleep ; it is still moving, and it is moving because it is alive. So that, after all, the boy is lively all the time, whether he is asleep or awake, and the real question is whether a thing which does not seem to move at all is alive like the boy. Must anything really alive be really lively like the boy ? We shall see.

We can imagine how a bird flying high in the air is able to look down on the surface of the earth. A bird's-eye view is a view that the bird has of the world when it is up in the sky ; it sees everything at once. Now, it is always necessary to take a bird's-eye view of anything we are trying to understand. If we take nothing but short views of one thing at a time our ideas will be as silly as a fly's idea of an elephant must be. We must see one thing at a time, and all things together—we must take both sorts of views. Let us try to take a bird's-eye view of living things.

When we do this we see that there are two great kinds of living things, very different from each other. The difference is not in size or quantity, but in kind or quality. The one kind of living things we call animals, and the other kind plants ; and they are quite different. There are many differences, but the difference we notice first when we take our bird's-eye view is a difference of liveliness. Animals move about themselves ; plants do not.

THE LIFE IN THE ANIMAL AND THE LIFE IN THE PLANT

Shall we say, then, that plants are not alive ? That has often been said and thought in the past, because men thought that if a thing was to be called alive it must be lively. We know that plants are not lively, like a cat ; you can always find a rose bush where you left it in the garden, but the cat is not always where you left it. So men thought that because plants did not walk away they were not really alive.

And then men came to see the truth of what we have already said—that, after all, there is something about a rose which makes it more like a fly than it is like a piece of stone, even though the fly can fly and the rose cannot. So men thought there were two kinds of life ; one was real, true life, like the fly's life, or the tiger's, or ours, and the other was a sort of half-and-half life, not the real thing but a feeble imitation of it, just enough to make a difference ; and men said that that kind of half-and-half life was the life of trees and plants. The men who said these things did not understand much about them. They knew that there was something strange about the oak and the acorn, but they could not persuade themselves that anything that was not lively was really and truly alive.

But men began to find out things at last. One man learnt something, the next man learnt a little more, the man who came after him learnt a little more still ; and so the world became wiser and wiser.

THE QUIET WAY IN WHICH THE PLANT KINGDOM DOES ITS WORK

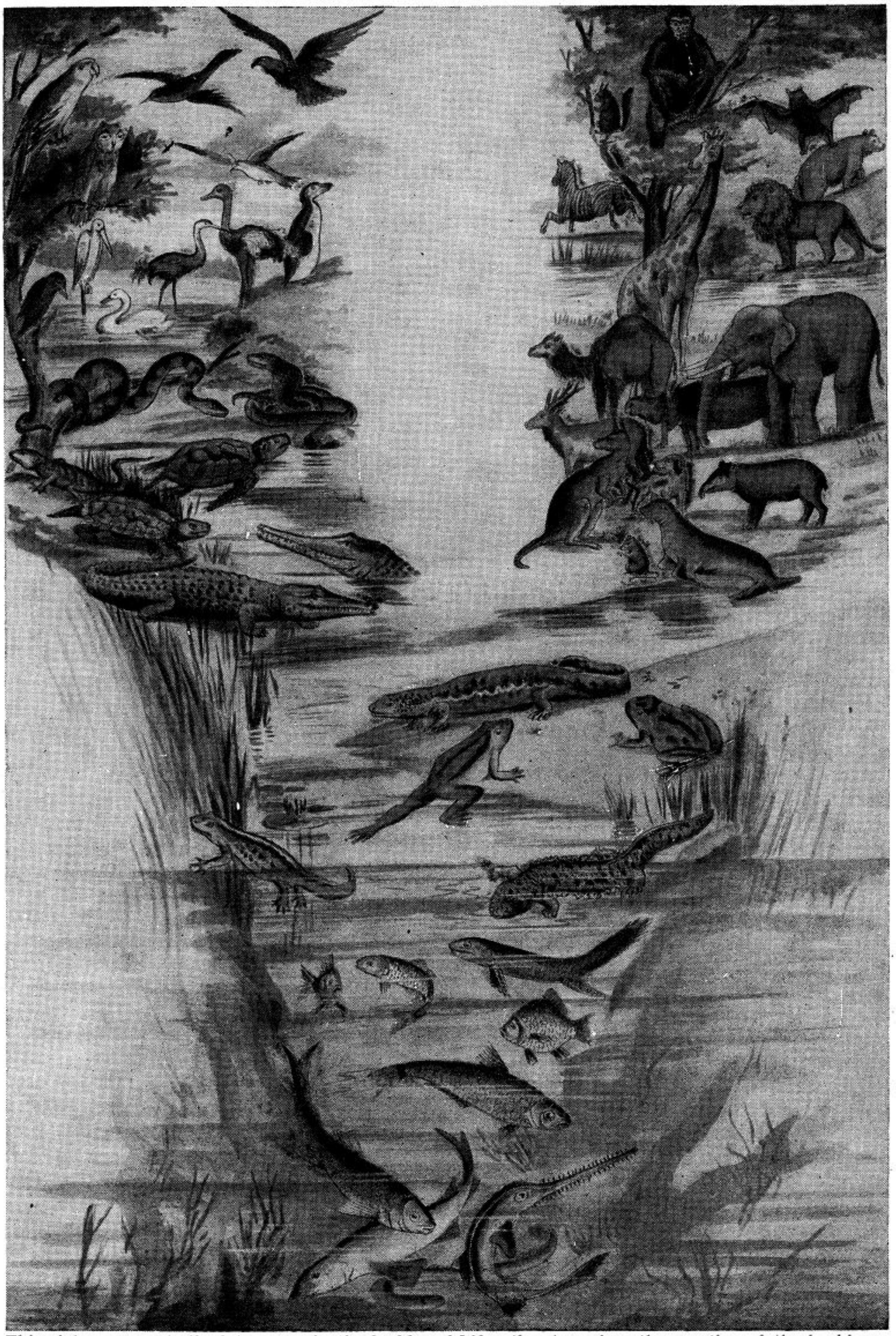
We know all that the men who lived before us knew, and we have also learned something they did not know. As men learned more about the world they were able to get a bird's-eye view, and the result of all their thinking is that we know now that plants are just as much alive as animals. In some ways plants are actually more alive than animals, even though they are not lively. The difference is that the life of the animal shows itself in liveliness, but the life of the plant shows itself in something else.

We know the animal is alive because it is lively, like the boy—like you. Your life shows itself in your liveliness. But we know the plant is alive because it helps the animal to live and to be lively, and for many other reasons.

Though the plant is very quiet and still, its life is very important, because it makes the liveliness of the animal possible. For the animal lives on the plant, and if there were no plants all animals would die.

Animals make a great noise, but plants do just as much work, only they do it quietly. We need not always be shouting and jumping and barking or blowing a

LIFE AND ITS WONDERFUL LADDER



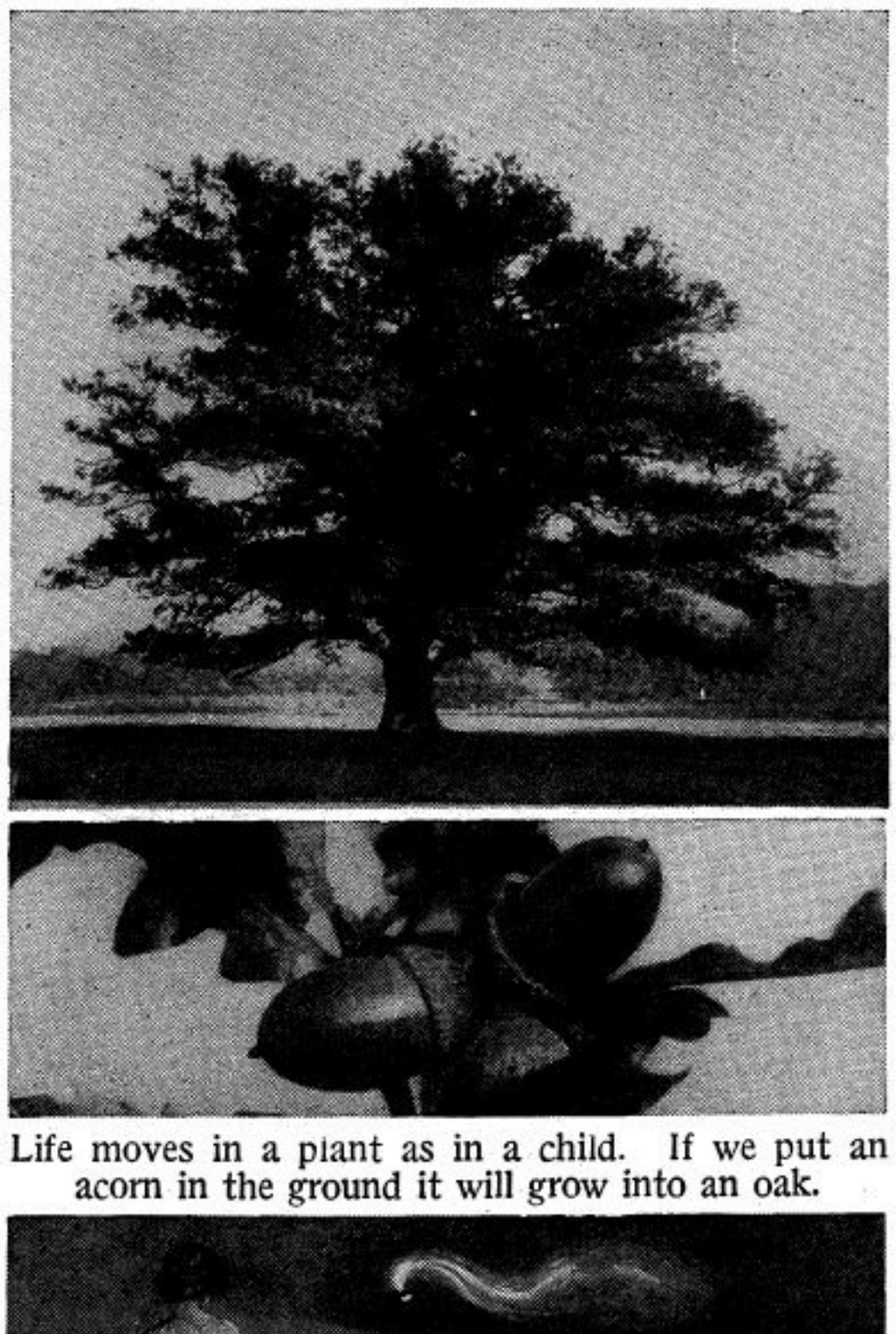
This picture suggests the later steps in the Ladder of Life—the steps since the creation of the backbone, which the first creatures had not. The oldest backboned creatures are Fishes. Above them are Amphibians, the land and water animals. Then there is a split. On the one side the Amphibians gave rise to Reptiles, and these gave rise to Birds. On the other side came the Mammals. Man came later in this last line.

trumpet to prove that we are alive. Plants do none of these things, but their life makes all other life possible.

We see now that life means more than liveliness. Many things that are not lively are really alive, but all living things do not make a noise and walk about. You may look at a thing and never see it move for a day, or a week, or a year, yet it may be alive. Life means much more than the idea of something which moves by itself.

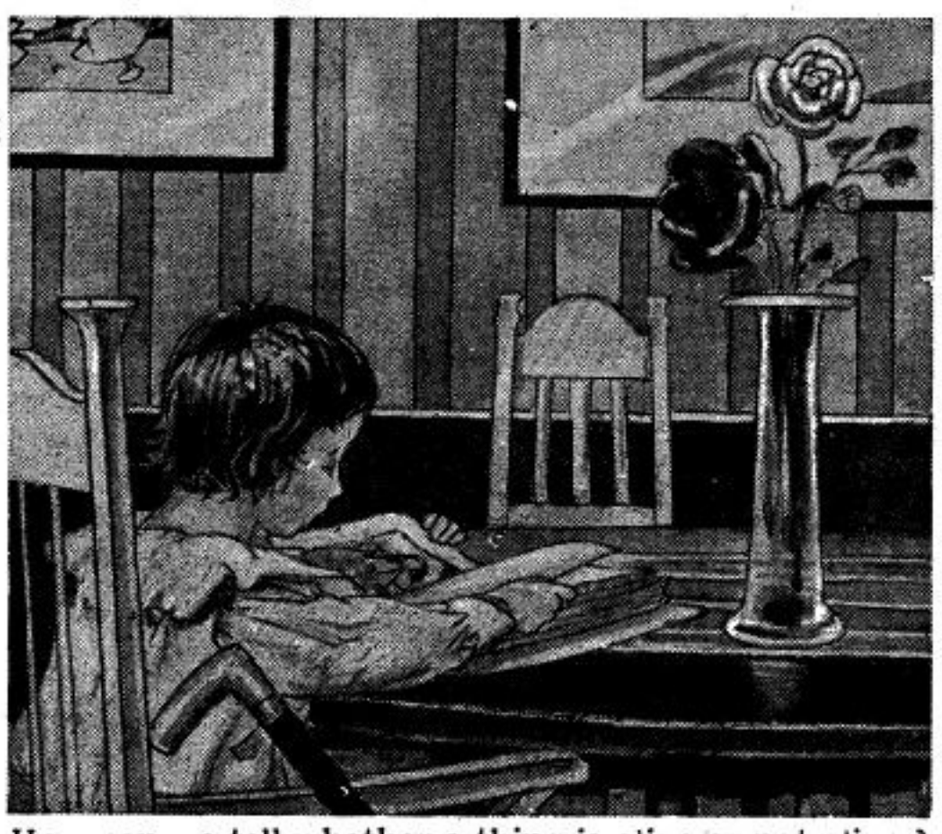
Movement is not really life, because *everything moves.* Plants do not walk about the garden, but they move by themselves. When the acorn grows into an oak it moves upwards. When the sunflower faces the sun as it grows it moves not only upwards, but in other ways also; and if we take the leaf of a plant and look at it through what is called a microscope we can see for ourselves that the tiny specks of green stuff which give the leaf its colour are ever moving.

Everything is moving, whether we see it or not, so that life is more than liveliness. The tiny specks of stuff that make up a pebble are always moving, and so are the black specks that make the ink on this page. If liveliness means life, then all things are alive, for all things are lively if we see them clearly enough.



Life moves in a plant as in a child. If we put an acorn in the ground it will grow into an oak.

In olden days a runner would carry a flaming torch, and as he fell out of the race would hand it on to another to keep burning. So each one of us carries on life.



How can we tell whether a thing is alive or not alive? What is the difference between a living thing, like a boy or a rose, and a thing not living, like a stick?

This is important to understand if we are to think properly of the life of the plant. Perhaps movement is the most important thing in the world, and perhaps, if we could really see deep enough, we should find that life itself is really a very special kind of movement or liveliness. But if life is just a special kind of movement, it is so very special that it makes all the difference whether a thing has this movement or not.

The best way for us to understand what it is that really makes a thing alive is to study very simple kinds of life. The most simple kinds are plant life or vegetable life; some are lively and some are not lively, but they are all alive. If there were no plants animals could not live. Plants are older than animals; that is to say, there were plants on the Earth before there were any animals, and the first kinds of animals were the children of the first kinds of plants.

PLANT LIFE

The Story of the Marvellous Plants that Cover the Earth

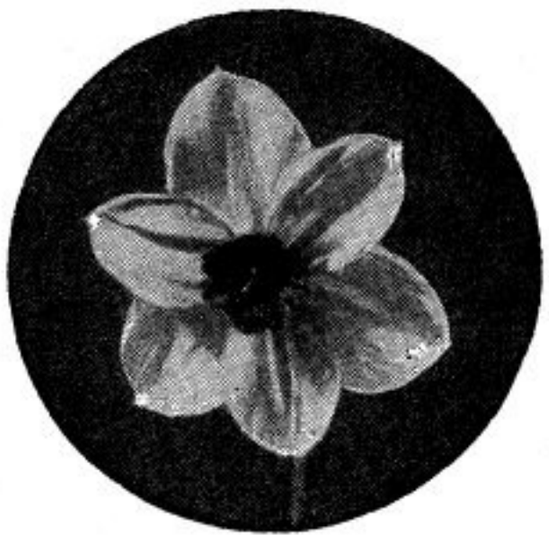
What This Story Tells Us

THE oldest living things on Earth are plants. They cover the Earth with beauty like a truly magic carpet, and they are the very foundations of our lives. We could not live without them ; but for the Plant Kingdom, spread over the whole surface of the Earth and along the surface and the bottom of the sea, the Animal Kingdom must perish. The whole world depends for its food upon plants, and the whole world depends, therefore, upon a secret that a plant has which no man knows ; for a plant knows how to take its food from air and water. It takes its supplies as it stands there rooted in the soil, nourishing itself in some mysterious way from the atmosphere direct. As we stand looking at it a plant is making its own food ; no man knows how. Here we shall read of the wonder that astonishes all who think of it—the life of the Kingdom of Plants.

HOW LIFE GOES ROUND AND ROUND

FOR a very long time there were no living creatures at all upon the Earth.

That was millions and millions of years ago, when the Earth was too hot to be a home of life. But the crust cooled, depressions were filled with water, and there was a heavy atmosphere of gas.



Then the first living creatures made their appearance, but we have no idea how or whence they came. What they were like, these firstlings, we do not know—almost all beginnings are very misty—but it is probably safe to say that they were microscopically small, like the microbes which cause rotting and disease. If we can imagine an observer of the Earth in the time of the dawn of life he would not have been able to see the teeming animalcules, any more than we can see the tiny specks of bacteria.

Another thing that is almost certain is that the first living creatures were neither decided plants nor decided animals. They were, so to speak, hesitating between these two very different lines of life. They were nearer plants in this way—that they were able to feed at a low level on water and carbonic acid gas (carbon dioxide) and salts in the water ; they were able in some measure to use the energy of the sunshine to help them to build up carbon compounds from simple materials.

The genealogical tree of all living creatures must be thought of as like an ornamental V, with little twigs on each half of its fork. To the left we may put the animals, and to the right the plants, and it would be useful to make the animal line go much higher than the plant line.

Everyone feels that there is a great gulf between a beech tree and the squirrel on its branches ; but we are not quite so clear when it comes to distinguishing between a mushroom and a sponge, and some of the old naturalists thought sponges and corals were plants of the sea. Still more difficult is it to be sure whether a living creature with a single cell is a plant or an animal, especially as some simple animals have managed to get hold of the green colouring matter called chlorophyll—which is characteristic of almost all plants.

Then, at the foot of our V-shaped tree, there are creatures, sometimes called Protists, which the botanists and the zoologists both claim. They have not yet taken the decisive step.

Long, long ago, then, some simple, single-celled creatures manufactured chlorophyll, surrounded themselves with a

cell-wall of cellulose—now sold in the shops as vegetable parchment paper—and began to build up quantities of sugar, starch, and other carbon compounds. These were the first plants, and they probably lived freely in the sea. The secret of their success was the ability to feed at a low chemical level, and to use the power of the sunlight in their chemical operations of building up. Their success meant much for future history, for *they began to form an atmosphere of free oxygen,* and they made carbon compounds sufficient to feed not only themselves but the animal world.

THE GREAT SECRET OF THE ANIMALS AND WHAT IT MEANT FOR THEM

Of course the animals had their simple beginnings too, and the parting of the ways was when certain creatures—the first animals—became addicted to the habit of not building up their own food but using what simple plants had made.

This discovery of ready-made food was the deep secret of animals, and it meant the possibility of great activity, of living adventurously! For food is just like fuel; it is a supply of chemical energy.

Plants are like manufacturers of munitions, and animals explode these in the never-ending battle of life. Happily for us, plants are like misers, accumulating much more than they need; animals are spend-thrifts, often living close up to their income. We can understand, then, why most animals get along comfortably without being green, and why they are nearly all free from the somewhat clogging and embarrassing material called cellulose, which forms the cell-walls of plants. Perhaps a plant may be compared to a knight of long ago, boxed in by his suit of armour. The muscles of animals could not do what they do if the wall of each muscle-cell were surrounded by stiff cellulose. It must be remembered that cellulose is chemically next door to wood.

THE SOMETHING OF THE ANIMAL THAT IS OFTEN FOUND IN THE PLANT

The two halves of the V-shaped tree of life diverge farther and farther, but it is not surprising that something of the animal may often be detected in the plant, and something of the plant in the animal. We shall have to return to the animal lurking in the plant, but let us take a few examples in the meantime.

The sundew and the Venus fly-trap and other "insect-eating plants" have turned the tables on animals; they depend in part on insects for their food, and catch them very effectively. Many leaves rise and fall, many flowers open and close, with the growing and waning light of day.

Young shoots bend and bow to the different points of the compass; the young rootlet moves in the earthworm's burrow; the tendril of the pea is extraordinarily sensitive to the touch of a twig, and its tip moves around in little paths *as if it were searching*; it is easy to see the movements of the stamens of the rock-rose, or the closing of the stigma of the musk.

All plants are sensitive in some measure, and Sir J. C. Bose, the great botanist of India, has proved that a tree may answer back to a passing cloud. Many plants, if not all, have some capacity for movement, and there is a telegraph-plant in the Ganges basin—called Desmodium—whose leaves are always moving a little. When the Venus fly-trap in the Carolina swamp shuts the two halves of its rat-trap-like leaf and catches a fly there is an electrical change similar to that which occurs when we contract our muscles in shutting our hands. There is no doubt that the animal lurks in the plant.

THE SOMETHING OF THE PLANT THAT IS OFTEN FOUND IN THE ANIMAL

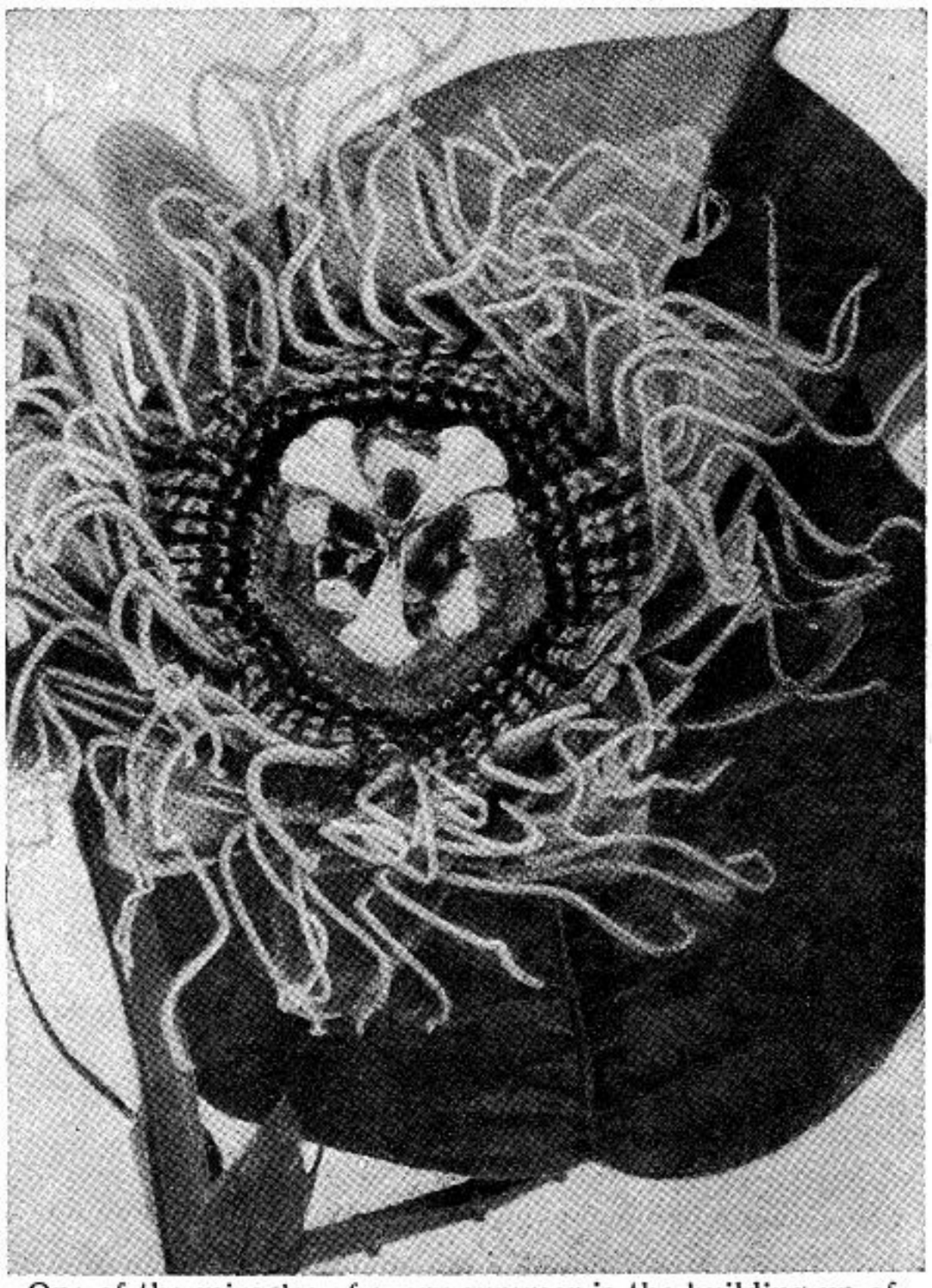
Many animals, like sponges, zoophytes, and corals, have relapsed into a plant-like sluggishness. Except when they are very young, they are fixed. Many of them are much given to branching, often in a very tree-like way. In the sea-squirts there is abundant cellulose in the enveloping coat—a characteristic vegetable substance in the most sluggish part of a very sluggish animal.

A number of sluggish animals resemble plants in accumulating quantities of stored material, which may be utilised in hard times or serve as a legacy for the young ones. Not a few animals have a very plant-like power of partially dying down when outside conditions are unfriendly, and some types form resting germs which last through the hard times of winter, as the seeds of many plants do.

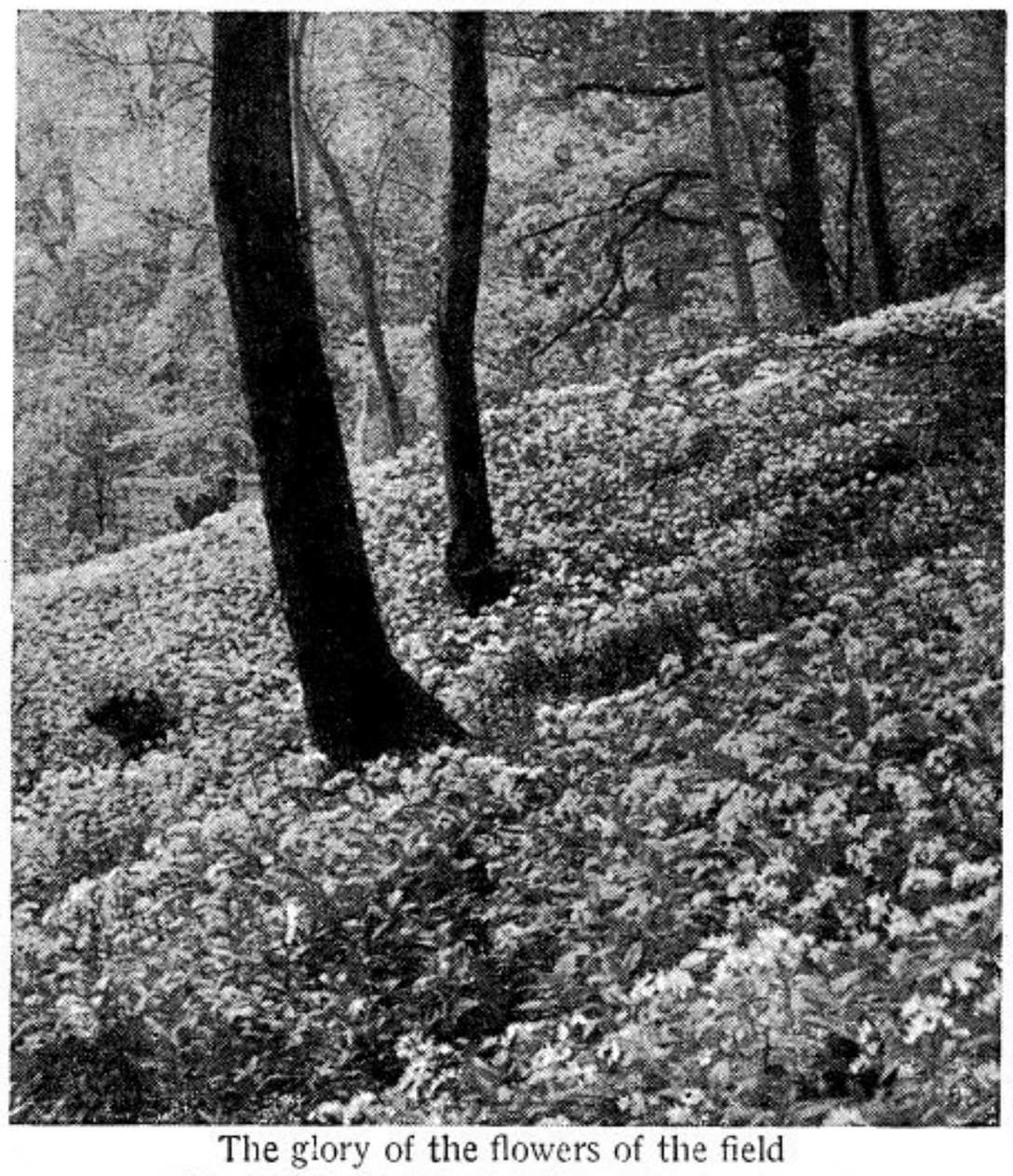
One must not make too much of green animals, for most green animals, like the green freshwater sponge, or the green fresh-

water Hydra, or green sea-anemones and corals, owe their green colour to tiny partner-plants which live inside some of their cells. There seem to be just a few cases where the animal has chlorophyll belonging to itself. In many cases—in some starfishes and worms, some lizards and birds—the green colour has nothing at all to do with the green colour of plants.

So far as complexity of structure and life-history goes, the whole kingdom of many-celled plants may be compared simply to the zoophytes and corals among animals. They are all within a comparatively narrow range. But what diversity there is between toadstool and oak tree, between the lichen on the hilltop and the fields of golden wheat, between the beautifully coloured seaweeds and the flowers of the meadow! Or, if we take a single class like that of ferns, what a multitude of kinds there are, each itself and no other!



One of the miracles of every summer is the building up of such a flower as this from a tiny seed



The glory of the flowers of the field

And we get the same impression of endless form-changes when we study a single order of flowering plants—say, the Rose order. All the members have a great deal in common; they are near relations.

Yet how different at first sight seem such plants as the rose, strawberry, apple, tormentil, and salad burnet! Who would think at first sight that the columbine, monkshood, and buttercup belong to the same order of Ranunculuses?

And, besides variety of form, there is variety of habitat. Where is there any plantless place, except in the darkness of the Deep Sea? There may be "red snow," due to a very simple plant, on a floating iceberg; there are some simple plants in hot springs; there are Alpines above the snow-line on the mountains; there are moulds glistening on the underground passages in mines; there is a partner-fungus spreading through and through the

heather-plant, even into the flower ; and doctors sometimes speak of the " flora " of man's food-canal !

Another fact so plain that we hardly think about it is the almost universal beauty in the plant world. The exceptions are certain cultivated plants, like cauliflower and cabbage, which have lost most of the beauty of their wild ancestors. And perhaps there are some parasites which do not live independent lives, and are therefore branded with some measure of ugliness. For beauty is the hall-mark of harmonious, healthy, well-ordered living, and it may be that, though life remains half asleep in plants, the beautiful shapes and colours are their dream-smiles.

Think of the harebells swinging by the wayside, the wood-hyacinths, which the poet speaks of as the heavens upbreaking through the earth, the laburnum's dropping wells of fire, the daffodils dancing by the lake-side, Wordsworth's " jocund company." No doubt there is easy beauty and difficult beauty, but the big fact is *beauty everywhere.*

BEAUTY CROWDS UPON US ALL OUR LIFE IN NATURE'S WIDE KINGDOMS

The old idea that beauty is exceptional, and to be looked for especially in such plants as orchids, has almost disappeared. Many orchids are, indeed, resplendent, and often strangely suggestive of butterflies, but one cannot say that they greatly excel some of our common flowers—the violet, the butterwort, the bog-bean, the bladderwort, the grass of Parnassus, the bog-pimpernel, and the daisy. The fact is that beauty crowds us all our life if we keep in touch with wild flowers ; and this is a fact not less important than the statement that the central secret of the green leaf is being a sunshine-trap.

We have not learned much botany unless we have come to feel the beauty of common plants. The poet Keats said that throughout his life nothing moved him more than the opening flowers, and there is something wrong with us and with our science if we do not feel the wonder of the crocus breaking through the sod. But it is worth our while, also, to discover thrills, to follow the stream up the gorge till we find the Royal Fern, glistening with spray beside a waterfall :

> Plant lovelier in its own recess
> Than Grecian naiad seen at earliest dawn
> Tending her font, or lady of the lake
> Sole sitting by the shores of old romance.

We are accustomed to think of strength in connection with animals and machines that move quickly about and do things and withstand assaults. The elephant, the railway-engine, the lighthouse, show strength. Whereas we are inclined to think of the tender plant, the bruised flax, the short-lived grass, the poppy which is broken by being plucked As everyone knows, many of our gay garden flowers are annuals, lasting only for the summer.

THE QUIET STRENGTH OF THE FOREST TREES AND THE WORK THEY DO

But this is only one side of the picture. The grass withereth and the flower fadeth, but, after all, the grass is one of the most successful of all living things. It has covered the earth like a garment.

This power of spreading and multiplying is all very well when the plant is on man's side, as most grasses are ; but when it is an injurious plant that spreads, like bracken in this country or prickly pear in India, then we see the menace there may be in the strength of plants.

We are often impressed by the weight-lifting feats of the strong man at the show, but have we done justice to the quiet strength of the forest trees, which are continually sustaining enormous weights against gravity, every year adding to their burden and lifting it higher ? We know the explosive power of dynamite, but it is very interesting to see the roots of a tree spreading within a cleft in the rock and ending by rending it asunder. We know of the great transformations of energy which go on in chemical and engineering works, but we must do justice to the intensity of the operations that continue unceasingly through the summer day in the chemical and physical laboratory of every green leaf ; and all without a sound !

NO PLANT IN THE WORLD LIVES OR DIES TO ITSELF

What strength of a sort there is in the way that microbes multiply, killing a king in a few hours ! If one bacillus of the plague gets entrance into man through the bite of a rat-flea it may be represented by a million the next day. What strength of renewal there is in many plants ; the hawthorn is all the more vigorous because of the hedgeman's savage pruning. Then there is the strength of longevity, for the oldest living creatures in the world are some of the big trees of California, which may have lasted for two thousand years.

One of our poets is responsible for the magnificent exaggeration :

Thou canst not stir a flower
Without troubling of a star

It is but a striking way of saying that no plant lives or dies to itself. Every one is the intersection of numerous threads in the web of life. Let us gather a few illustrations of the part plants play in the Natural Kingdom.

First, there is the work of plants in *the circulation of matter*. As we have seen, green plants feed on air, water, and salts ; they use the carbon of carbon dioxide as the basis for manufacturing the essentials of life known as starch, sugar, fats, and what are known as proteins.

Some animal eats the plant, or part of the plant, and another incarnation begins. For the nutritive material obtained from the plant—the nectar the bee changes into honey, the nut the monkey cracks—becomes part and parcel of the animal's body ; it is incorporated in some measure into the animal's living matter.

As the animal lives it gives off carbon dioxide, and this carbon dioxide, when it again enters the atmosphere, may be absorbed by a green plant.

THE WONDERFUL CYCLE OF LIFE THAT NEVER ENDS AND NEVER FAILS

Life works in a cycle. Water, gases, and salts are absorbed by plants as food. The plants are eaten by animals, the animals die, and bacteria destroy their bodies. From these bodies arise new gases, water, and salts. These are absorbed by plants again, and the cycle of life begins afresh.

Other forms of waste from the animal pass into the soil and may help to form salts which the roots of plants may absorb. Some may pass as ammonia into the air, and this may be washed down by rain into the soil, to be again re-captured by the roots of plants. Or, when the animal dies and sinks to the ground, bacteria begin to work on the dead body, and it rots. Its complex substances are broken down into simple substances, such as carbon dioxide, water, ammonia, and some salts. Out of a dead bird on the ground the bacteria make materials which plants can utilise. Bacteria act as middle-men between the dead animal and the living plant. They make the materials of the dead body fit to enter again into the cycle of life; and so the world goes round.

THE SMALL SPECKS OF LIFE ON WHICH THE CREATURES OF THE SEA LIVE

If we pay an early morning visit to a great fishing-port, such as Hull, Grimsby, or Aberdeen, we see what look like miles of fishes laid out for sale. We get a glimpse of the harvest of the sea, and the question arises in our minds: How is man able to take so much out of the sea, year after year, when he puts so little in? If he did this on the farm there would soon be exhaustion of the soil, and he obviates this on land by putting in manure. But what happens in the sea?

The answer is partly to be found in the vegetable sea-dust which is wafted outwards and downwards from the shallow water, where seaweeds and sea-grasses flourish abundantly. Minute particles, worn off by the breakers or nibbled at by animals, are washed down the slope and form the food-supply of fishes or animals, worms and molluscs on which fishes feed. It takes ten pounds of this vegetable sea-dust to make a pound of worms; it takes ten pounds of worms to make a pound of whelk; and it takes ten pounds of whelks to make a pound of rock-cod!

THE WONDERFUL CYCLE OF LIFE BY WHICH THE WORLD GOES ROUND

But the other half of the answer is to be found in what Sir John Murray called the floating sea-meadows of the Open Sea. Countless millions of diatoms and other minute algae form a sort of living sea-soup at or near the surface of open waters. These minute organisms depend on the air and the sea-water with its salts; in the sunshine they go on with their work of building up life from light, like the leaves of the forest; they and some minute green animals form the fundamental food-supply of small crustaceans; and these, again, are devoured by fishes. The Earth is run on a plan of successive incarnations something like this:

Air, water, and salts are absorbed by green plants in sunlight.

Nutritive carbon compounds are built up out of these, and are eaten by animals.

The animals die, and their dead bodies are destroyed by bacteria.

From the decay of these bodies gases, water, and salts are formed.

These are absorbed by green plants again, and the cycle of life begins afresh.

A great transformation of energy is always going on in plants. The plant is a laboratory of complex chemical substances, and each has its own peculiar chemical routine, as every chemical factory has. But this work of building-up could not keep going without help from outside, and it is the green plant's special secret to obtain this from the orange-red rays of the sunlight. The energy of the sunlight is used by the plant to help it in its manufacture of carbon-compounds, which have chemical energy just as gunpowder has.

THE MYSTERIOUS EVENT ALWAYS TAKING PLACE IN A GREEN LEAF

Thus there is a continual changing of kinetic energy into potential energy. We see the same thing when the kinetic energy of a rush of water is used by a hydraulic machine to raise a heavy weight to a height, where it has energy of position, or *potential energy*. But what takes place in the green leaf is a more intricate transformation, and it is not yet fully known.

We shall have to do with many other "between" things, or linkages. Thus, one plant may unconsciously play into the hands of another, as when the dodder gets both support and food from the nettle; or when the mistletoe gets support and watery sap from the apple tree; or when an alga joins with a fungus to form a double plant or lichen; or when root-tubercle bacteria join in with clovers and enable them somehow to utilise the free nitrogen of the air. On another line are the linkages between flowers and their insect visitors, which secure fertilisation, and the linkages which secure the scattering of seeds by fruit-eating birds. But we have made a good start toward understanding the relations which bind plants to the rest of Nature.

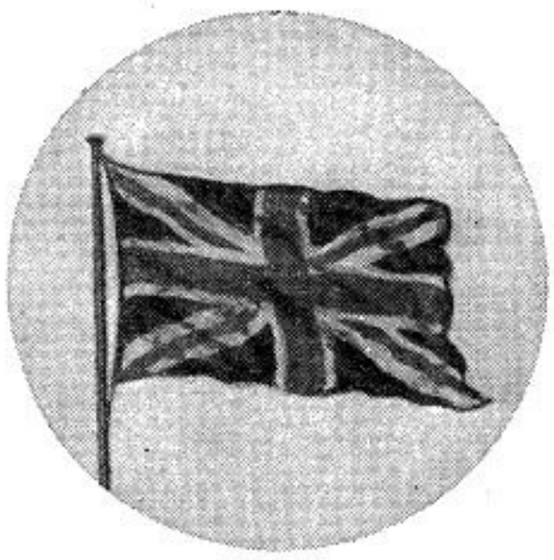
The Story of the Peoples of All Nations and Their Homelands

What This Story Tells Us

THIS wide world, 8000 miles in diameter and 25,000 miles round, with over fifty million square miles of land and more than twice as much water, is the home of 2000 million people. Some of them are crammed up in great cities ; some are scattered here and there with vast spaces all around them. Greater London, with about seven hundred square miles, has more people than all Australia, with about three million square miles to live on. There are still forests and deserts that keep back population, but rarely do we find a spot on Earth that is not home, sweet home, to somebody. Which way is the world going ? Backwards or forwards ? In our own time the world has been thrown back by war, plunged into evil and disaster, but we who make this book believe that still the world will go forward. Here we see the life of the peoples who share the world with us.

THIS GREAT WORLD OF OURS

ONCE upon a time, in the not very distant past of our ancestors, there was no such word as World. They used two words meaning Man and Age. When they did at last run these two into one, making it presently our own familiar word World, they meant by it *an age of man*. They never used it to suggest the whole Earth as we do now.



It is in this ancient sense that we will now speak of the world—our world, the world composed of living men, women, and children in every corner of the Earth, the rich and various humanity of this planet circling round the flaming Sun.

What is it that first strikes us as we look at our world ? Is it the difference which exists in speech, the difference which shows in raiment, the differences which mark one nation from another in complexion and size ? No ; something much more difficult to understand.

The first thing to strike us in looking at the inhabitants of the Earth is the extraordinary distances which separate the various peoples *in time*.

It is the same hour for the whole Earth. For the history of the entire planet, it is the twentieth century since the time of Jesus. And yet look at the vast time-distances which separate the French mathematician from the Laplander, the American inventor from the American Indian, the German chemist from the African negro, the English engineer from the peasant of Egypt.

The age of the Earth is the same for all the world, and Asia was civilised many centuries before Europe ; yet at the westernmost parts of Europe, so lately barbarian, we see more science, more art, more refinement in morals and manners than in the very heart and centre of the once regal East—the East of Babylonia, Assyria, and Greece.

At once, then, we learn to be careful how we speak of the world. It is absurd, and it is also dangerous, to speak of the world as if it were a body of people all marching together on one road towards one definite goal. It is absurd to speak of the Present as if it were the Present for all the world, or of the Past as if all the world had done with it and was pressing forward to one Future for all mankind. We must speak of the world as a long chain of humanity which at all times stretches from the very beginnings of human history up to this fleeting moment

which is flashing onward into the future as we speak.

We are reminded of that old story of a traveller through Time, told in a book seven hundred years old.

In passing one day by a very ancient and extremely populous city, I asked one of the inhabitants who founded the place. He replied: "I know not; and our ancestors knew no more than we do on this point." Five hundred years afterwards, passing by the same place, I could not perceive a trace of the city. Inquiring of one of the peasants when it was that the city was destroyed, he answered me: "What an odd question! This country has never been other than you see it now." I returned there after another five hundred years, and I found a sea. I now asked the fisherman how long it was since their country became a sea, and he replied that I ought to know it had always been a sea. I returned again after five hundred years; the sea had disappeared, and it was now dry land. No one knew what had become of the sea, or if such a thing had ever existed. Finally, I returned once more after five hundred years, and found again a flourishing city. The people told me that the origin of their city was lost in the night of time.

So Time covers up the history of men.

EVERY NATION HAS ITS GOOD MEN AND ITS BAD MEN

But there is another way in which time enters into our view of the world. Each country is composed of people who are living at different points in this chain, people whose mental clocks are all striking a different hour.

One of the greatest of thinkers said that he did not know the way in which to draw up an indictment against a whole nation. It can never be done. Each nation has its savages, its barbarians, its illiterates, its half-civilised, and its civilised. Each nation drags the same world-chain on its journey to the future. There are saints in India and criminals in England. There are philosophers in China and ignoramuses in Germany. There are geniuses in Arabia and yahoos in America.

We see, then, that the difference of all differences in this great world is one of time; and when we ask what we mean by time in this sense we discover that it is a question of intelligence. To be a savage is to be near the starting-post of life. To be an educated and law-abiding person is to have run some part of the race through time. To be a genius or a saint is to be nearing the goal.

There was genuine inspiration in the lines of old Andrew Marvell:

The world in all doth but two nations bear;
The Good, the Bad; and these mixed everywhere.

Indeed, the whole business of politics, philosophy, and religion lies now in getting the Good to act together as one nation, not to crush and destroy the Bad, but to encourage them to travel a little faster. It is because the world is marching out of step, and at such different paces, that we get confusion and the constant danger of catastrophe.

THE HOME OF TWO THOUSAND MILLION HUMAN LIVES

We shall notice many other interesting differences when we come to visit all the countries of the Earth in this book. No nation will show us the same picture. Each country to which we travel in thought will tell us a tale told by no other. Every people will speak to us in a tongue quite different from the rest.

We shall be looking at the details of a tremendous canvas, at particular threads in a long tapestry, at small fragments in a vast mosaic; and we shall have to remind ourselves from time to time of the thing as a whole—not of France, not of Italy, not of Japan, not of Mauritius—but of the world.

This mighty world consists of some two thousand million human beings. It is divided up into a hundred nations or peoples. Here it spreads itself over an enormous space and calls itself India. Here it creeps away into a little corner of snow-capped mountains and calls itself Scandinavia or Switzerland. Here it swarms over a fierce and desolate territory and calls itself Russia. Here it captures a few little islands and calls itself England.

THE VAST AREAS OF THE WORLD THAT WE SHALL SEE

At one point, as in China or Japan, this world is so congested that the very road-sides must be cultivated for food; at another point, as in Australia, every man has a square mile to himself. We shall visit the prairies of Canada, the tropical forests of the West Indies, the sultry streets of Spain, the frozen peaks of Cau-

OUR NEIGHBOURS OF FOUR CONTINENTS

A ZULU GIRL

A RED INDIAN

A BOY OF TUNIS

A BOY OF CHINA

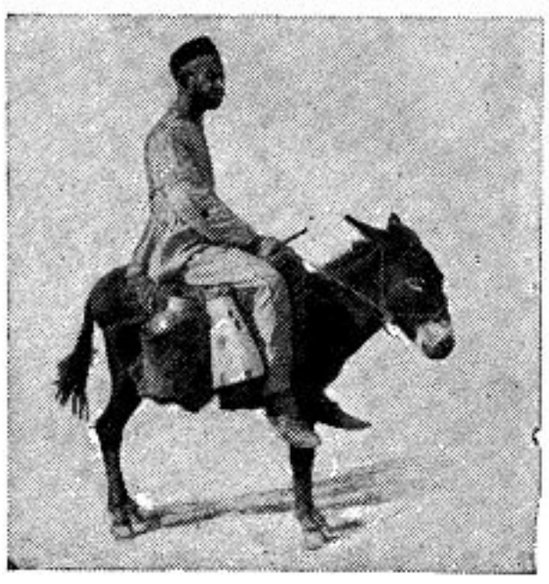
SONS OF HOLLAND

A YUGO-SLAVIAN WOMAN

A LITTLE LADY OF JAPAN

PEASANTS OF RUSSIA

A GIRL OF NORWAY



A MAN OF PERSIA

AN ARAB

casus, the sandy wastes of Arabia, the domestic calm of Holland, the mighty waters and far-stretching deserts of Africa, the storied cities of France, the rocky fastnesses of the Balkan peoples, the dismembered empire of Austria, the slumbering islands of the South Sea, the romantic towns of Germany, the shores of Portugal, and the lovely realm of Italy.

But what will specially interest us in this grand tour, this journey round the world, is the present condition of the human mind. We shall see the average person in each country moving before our eyes in one direction or another.

THE MEMBERS OF THE BIG WORLD FAMILY WE SHALL MEET

We shall see the odd little figure of the Chinese awakening from his sleep; the German building a new world on the ruins of an old; the Frenchman loving art and following the path of strict logic; the Italian turning from the monuments of a past of unrivalled glory to the factory of modern industry, a future of trade and commerce.

We shall see the industrious Norwegian harnessing his tumultuous waters to the service of man; the Indian uncertain whether to follow his holy books or Herbert Spencer; the Russian suffering unimaginable inconvenience and privation under a new system of government; the Englishman digging his garden, building his ships, and spinning his cotton; the Australian riding after his sheep and the Canadian after his cattle; the Cingalese diving for pearls and picking leaves from the tea plant.

We shall see the Spaniard waiting for a sign; the Mexican flaming into sudden passion; the Hollander smoking his pipe on the side of a canal or in the midst of acres of tulips; the American ceaselessly making new things to lift the load of labour from mankind.

WHILE A CHILD AND WHILE A FLOWER IS BORN, THE WORLD IS YOUNG

And when we have seen all these things, and thought about them, we shall not only be able to form an opinion as to whether the nations will find a way out of the financial and industrial chaos into which they were thrown by war, but we shall have at least some notion as to the spirit in which mankind should face the manifold new problems of life today.

We shall see quite clearly that one nation cannot suffer want and woe without inflicting want and woe on other nations. We shall see that while nations live like wolves and vultures there will always be suffering on the Earth; and that until they all cooperate together, as the wheat cooperates with the soil, and the bee with the flower, and the rivers with the sea, there can be no lasting peace on this planet, and no permanent security for human life.

And, however dark seems the future, we shall learn from the troubled past that, so long as the Good strive nobly and earnestly forward, the Bad can never drag us right back to the past;

For a while a youth is lost in soaring thought,
And while a maid grows sweet and beautiful,
And while a spring-tide coming lights the South
And while a child and while a flower is born,
And while one wrong cries for redress and finds
A soul to answer, still the world is young.

So the present generation, if it have faith, if it have courage, if it have a clear conviction of the one far-off divine event to which the whole Creation moves, may be able to break down the madness of war, the wickedness of jealous rivalry, and help to carry the world over the dangers brought about by the pursuit of a blind and selfish nationalism.

And so on to the end (and the end draws nearer)
When our souls may be freer, our senses clearer
(Tis an old-world creed which is nigh forgot),
When the eyes of the sleepers may waken in wonder,
And hearts may be joined that were riven asunder,
And Time and Love shall be merged—in what?

IF LOVE IS THE WAY, LOVE MUST BE THE END

The answer to that question is the great riddle of existence; but if Love is the way Love must be the end. At least we may be certain of this—that moral intelligence makes for Love, and that in all the nations of the world the Good are those who believe in Love as the one solution of human difficulties. No prouder boast can be uttered by the human soul than that which claims kinship with the Mind of God in the universe, and says:

On Earth there is nothing great but Man,
In Man there is nothing great but Mind.

Illustrated Maps of All Countries with Many Thousand Pictures

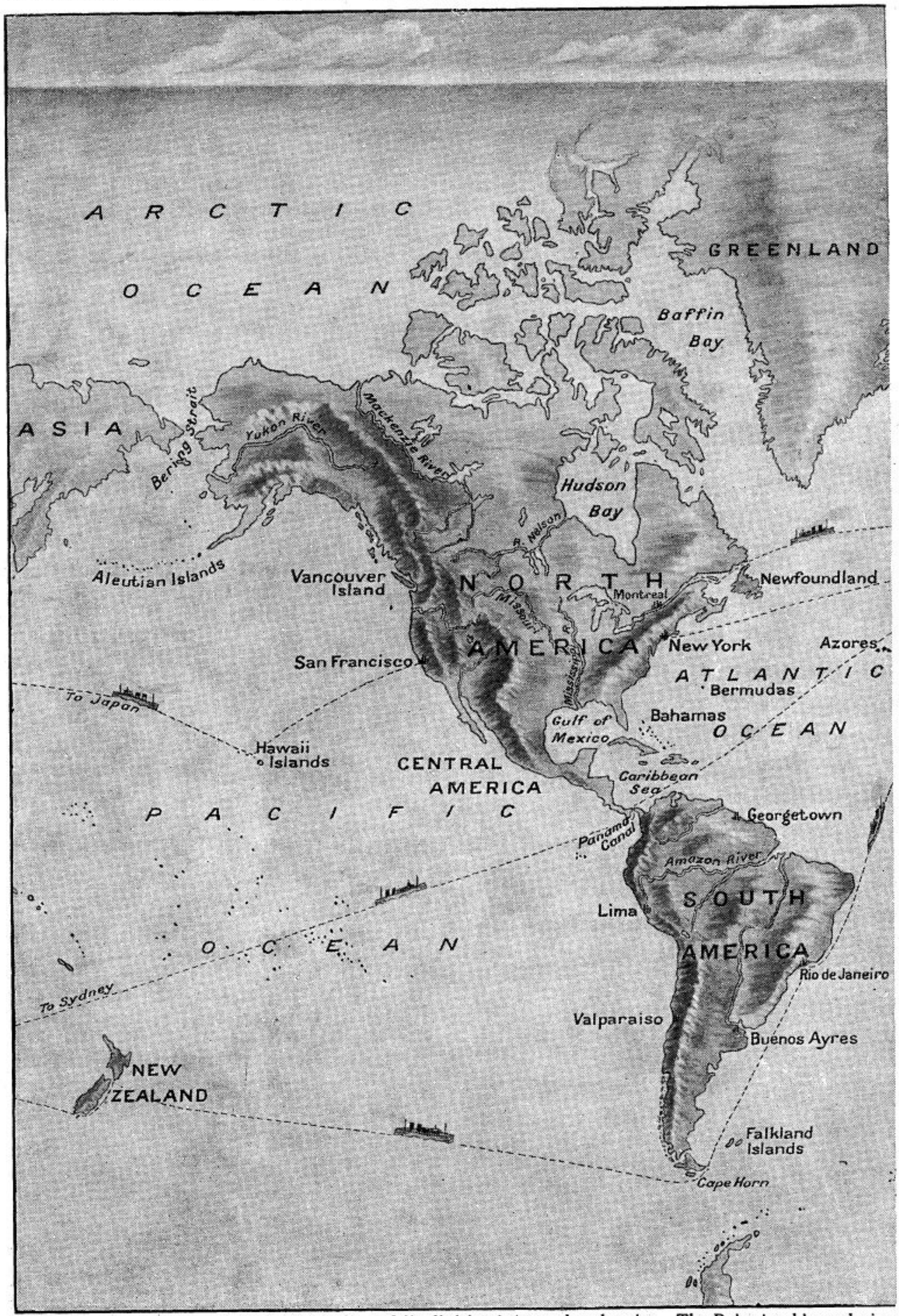
What These Pages Show Us

HERE we shall see, in pictures and maps, what the surface of the Earth is like. Such an array of picture maps we shall have in these pages as has rarely, if ever, been brought together before. They will show us, not only the boundaries of nations, the rivers and hills and oceans, but often the insect life and plant life of a country so vital to its prosperity and the proper development of its natural resources ; the animals and birds, and the remarkable migration of living things ; great events in its history and where they happened, sometimes the fossils that lie under its fields. With these maps, too, come hundreds of pictures illustrating striking scenes in these lands, their picturesque landscapes, their innumerable industries, peoples, cities, and buildings, while the little pictures which have been carefully drawn on the maps must number many thousands.

THE WONDERFUL GLOBE WE LIVE ON

ON THIS SPINNING GLOBE, FASHIONED COUNTLESS MILLIONS OF YEARS AGO FROM A CLOUD OF FIRE, LIVE TODAY A HUNDRED RACES AND NATIONS

THE EARTH—FIFTY MILLION SQUARE MILES OF

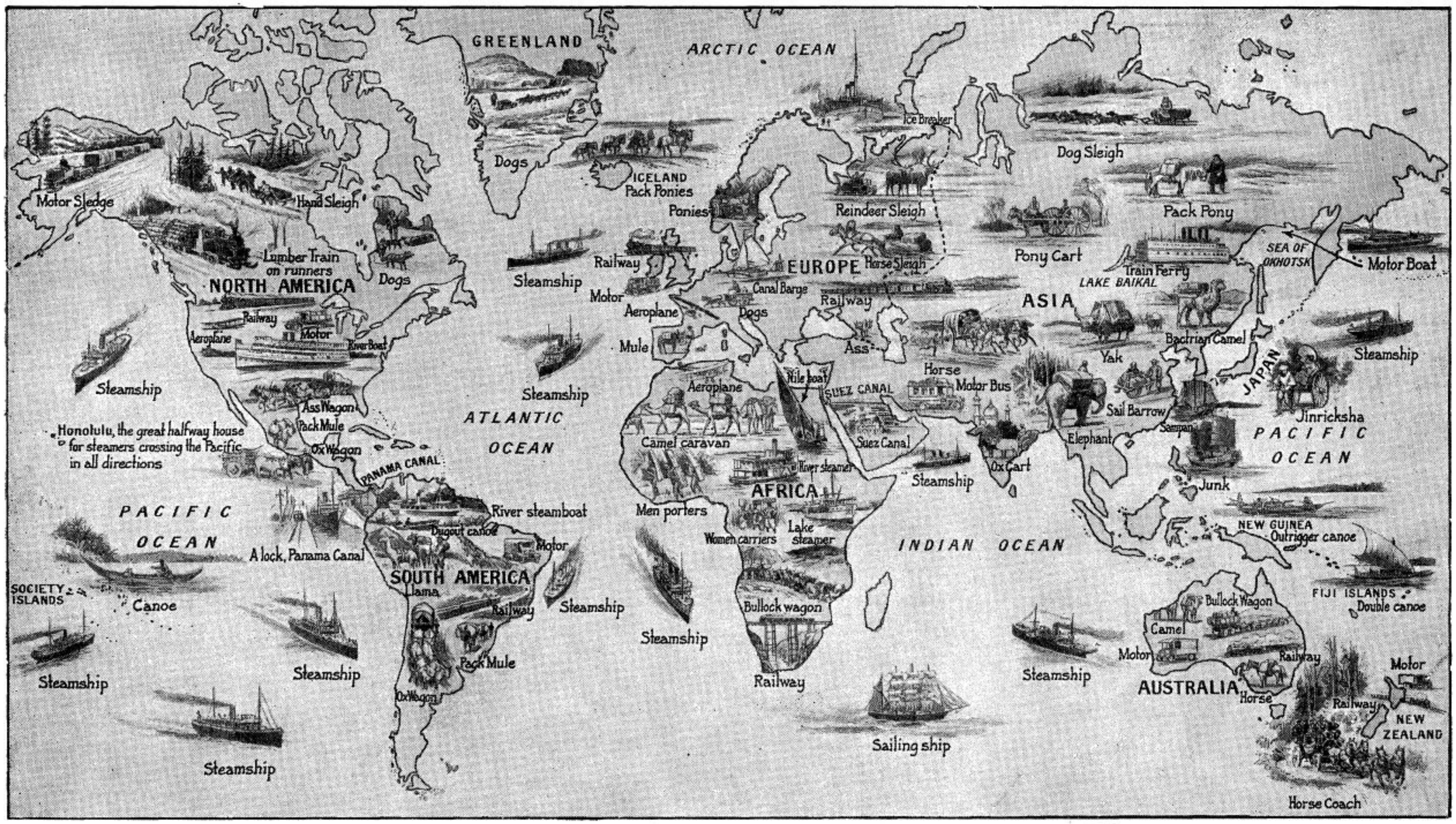


This map shows the surface of the Earth and its division into land and water. The Polar land boundaries have not been finally mapped, but the whole surface of the Earth is about 197 million square miles, of which about 57 millions are land. Europe has 3,750,000 square miles, and a population of almost 500 millions. Asia, four and a half times as large, has more than 1000 millions. Africa, three times the size of

LAND ON WHICH 2000 MILLION PEOPLE LIVE

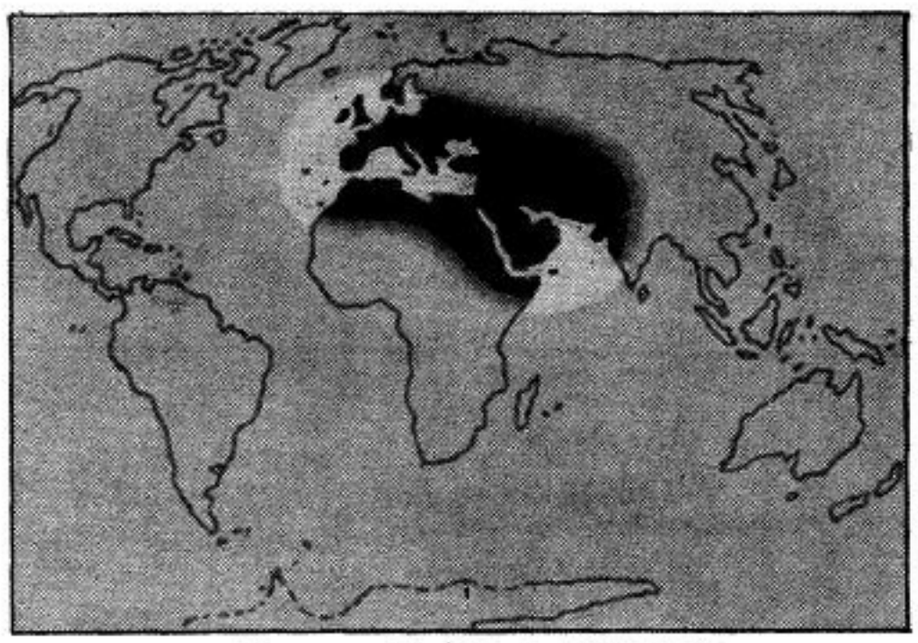
Europe, has nearly 200 million people. North and South America are four times the size of Europe, and have about 250 million people. Oceania is nearly as large as Europe, but has fewer than ten million people. The oceans, covering about 140 million square miles, occupy over 80 per cent of the southern half of the world. The Pacific covers nearly 64 million square miles, the Atlantic about half as many.

HOW WE GET ABOUT THE WORLD—TRANSPORT BY LAND, SEA, AND AIR

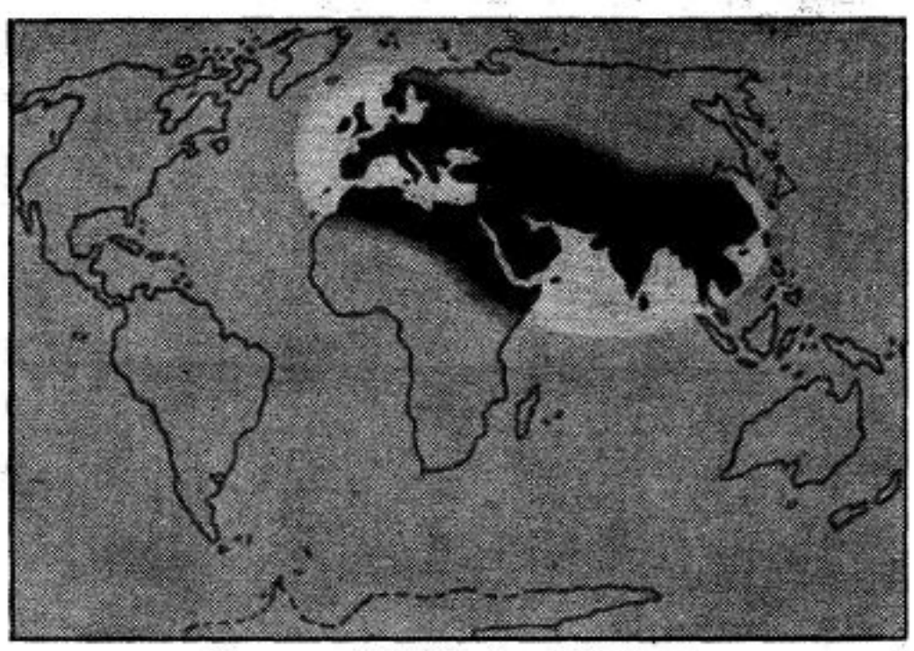


HERE OUR ARTIST HAS PICTURED THE MEANS OF TRAVEL CHARACTERISTIC OF EACH COUNTRY

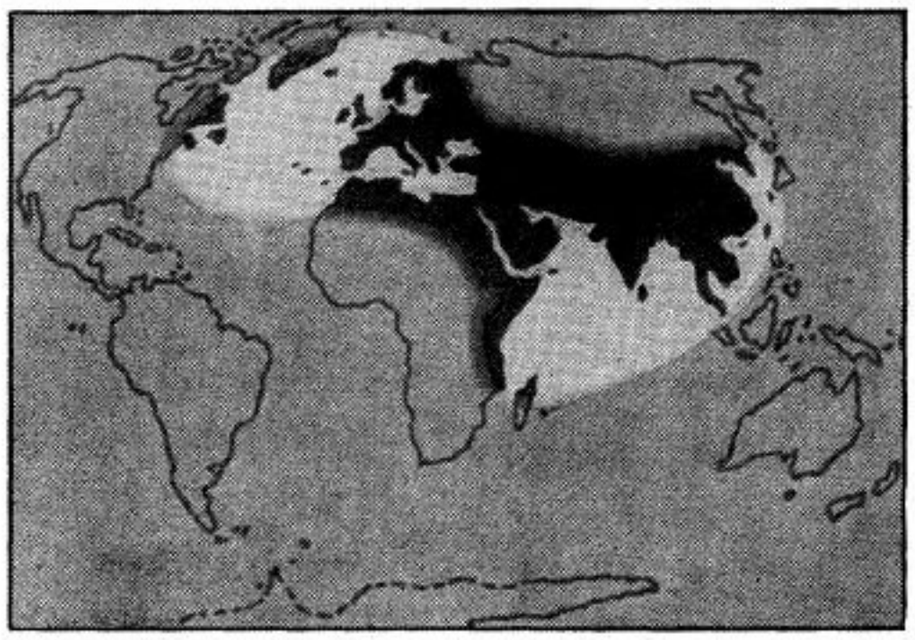
WHEN THE WORLD BECAME KNOWN



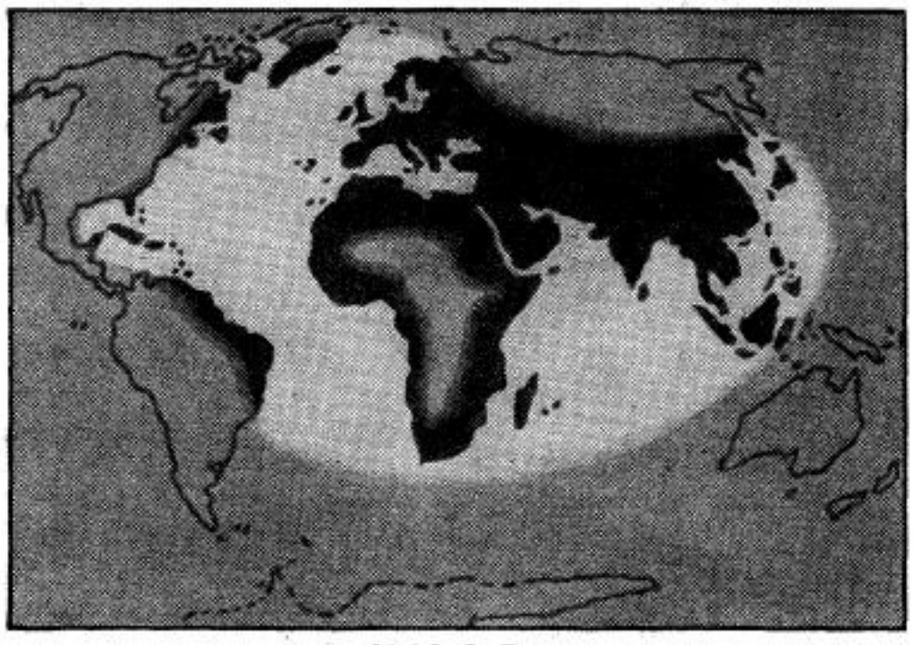
Known World in 325 B.C.



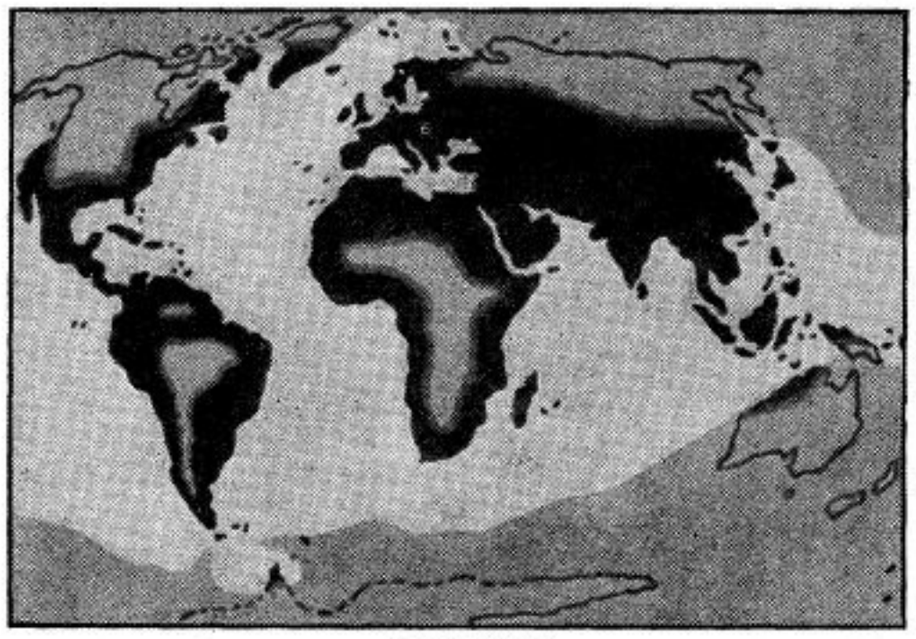
Known World in 300 A.D.



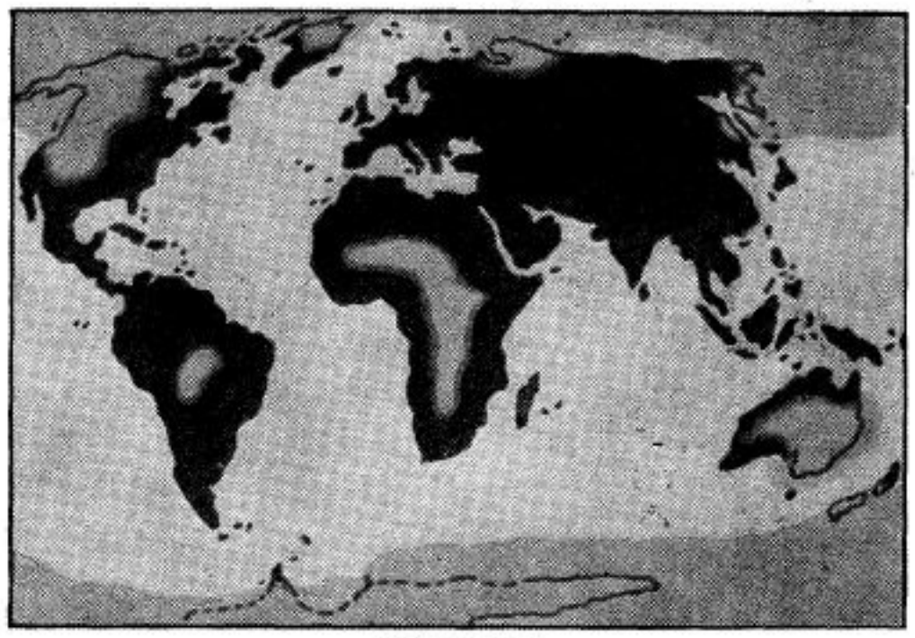
1000 A.D.



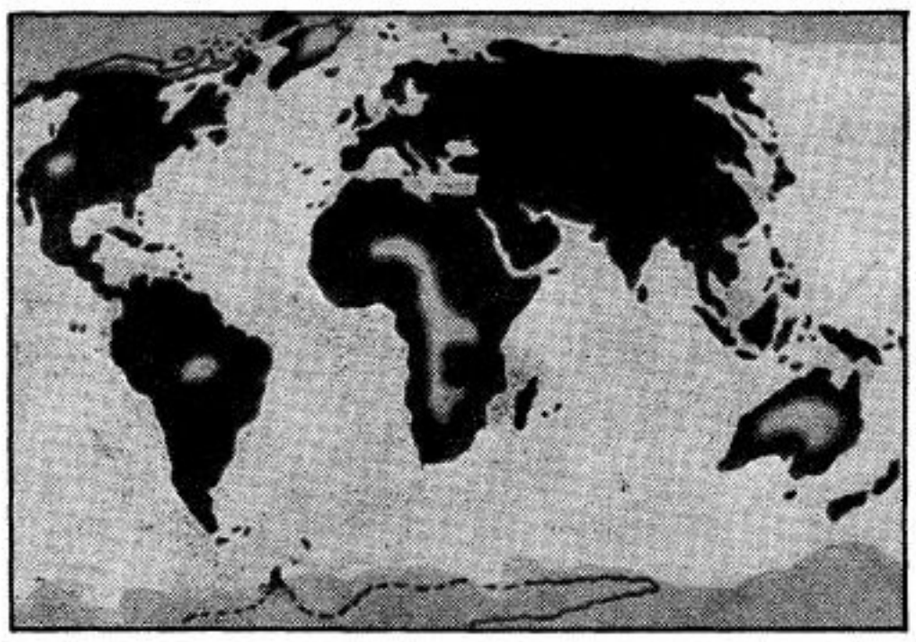
1500 A.D.



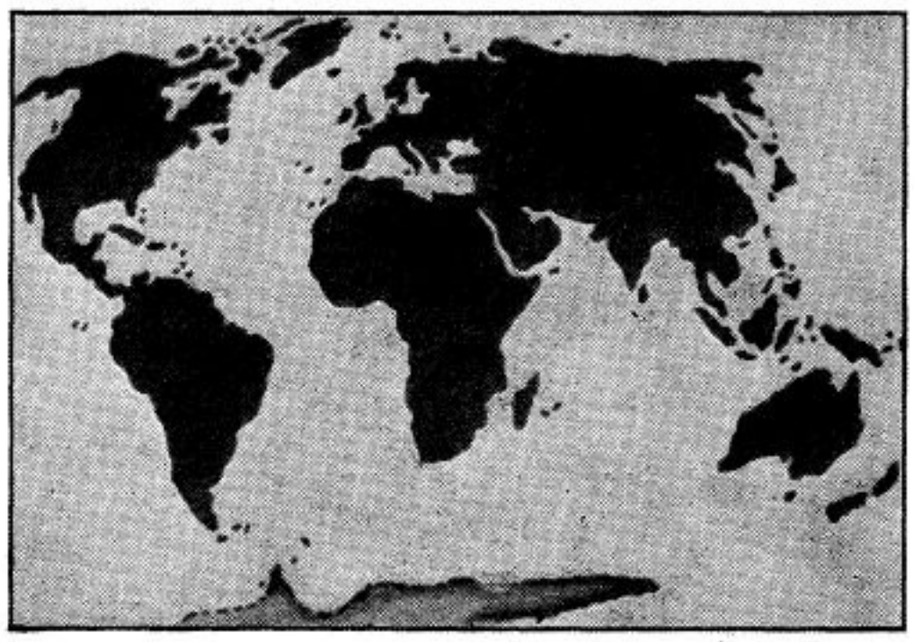
1600 A.D.



1700 A.D.



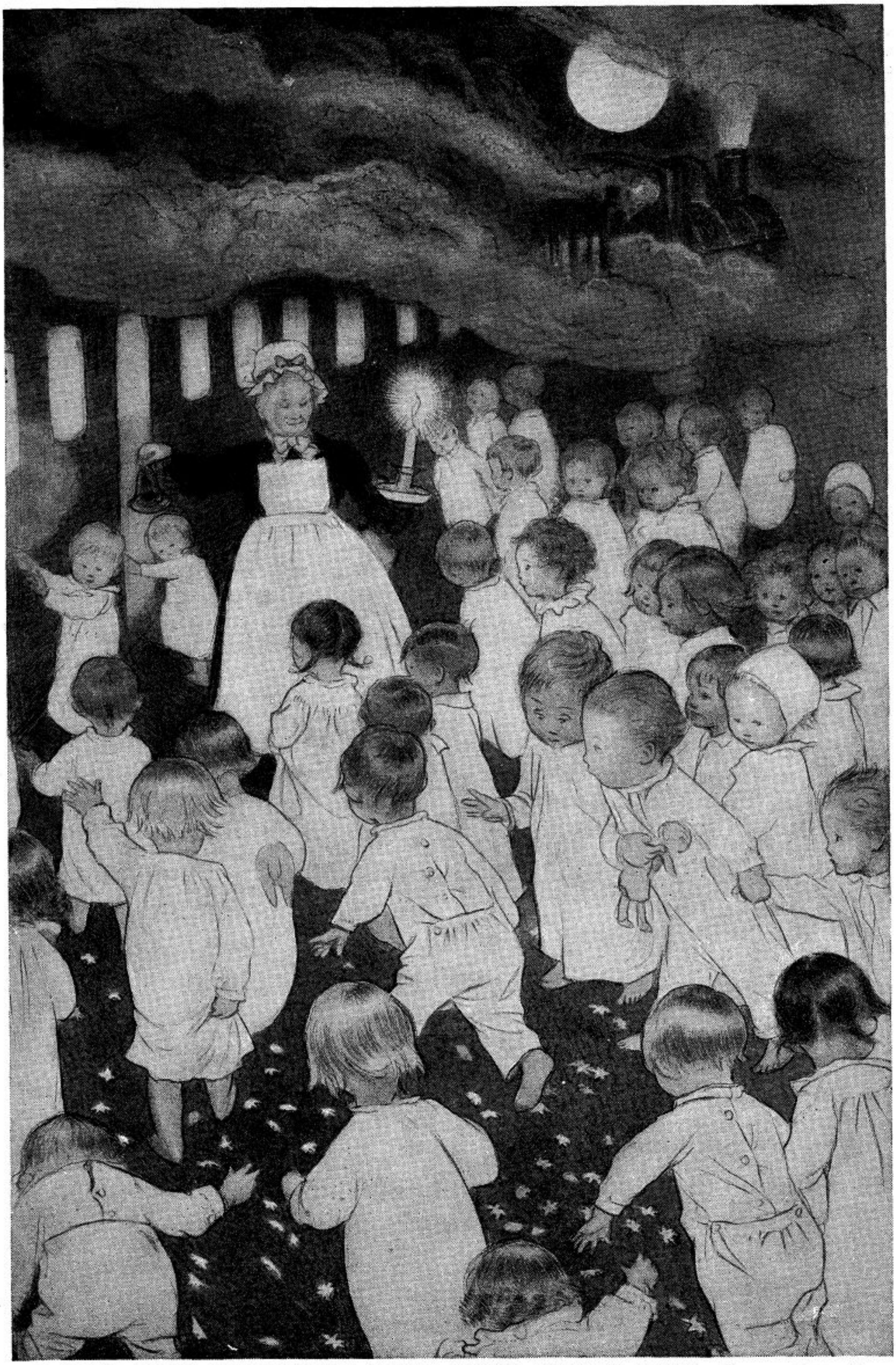
1800 A.D.



Today

THE WORLD AS KNOWN IN EIGHT PERIODS IN HISTORY. KNOWN LAND IS SHOWN IN BLACK

OH, THE SIGHTS THAT THEY WILL SEE



SHUT-EYE TOWN IS PASSING FAIR, GOLDEN DREAMS AWAIT US THERE. See poem on page 98

One Thousand Poems of All Times and All Countries

What These Pages Give Us

THE poetry of the world is the noblest thing that every child inherits. It is more precious than all the gold in the mines of Africa. There are poems we would not sell for all the crowns of kings. They are the sweetest music of our tongue. They enshrine in matchless words some noble thought, some famous deed, some heart's great dream. One of our poets pictured the lark pausing in its flight to listen as the poet sang ; and he goes on :

And the nightingale thought, "I have sung many songs, but never a one so gay,
For he sings of what the world will be when the years have died away."

It is poetry that leads us on to the vision of what the world will be, and it is the poet who, more than any other man, weaves himself from generation unto generation into the very hearts and lives and souls of men.

THE GRANDMOTHER'S TALE

Pierre Jean Béranger was a great song-writer of France. He lived through the most exciting periods of French history. He was a great admirer of Napoleon, and, though his genius was worthy of a nobler theme, we can hardly help being moved by his pathos and humanity in these lines. He was born in 1780, and died 1857.

His fame shall never pass away !
Beside the cottage hearth the hind
No other theme shall list to find
For many and many a distant day.
When winter nights their gloom begin
And winter embers ruddy glow,
Round some old gossip closing in,
They'll beg a tale of long ago—
" For all," they'll say, " he wrought us ill,
His glorious name shall ne'er grow dim,
The people love, yes, love him still,
So, grandmother, a tale of him,
A tale of him ! "

One day past here I saw him ride,
A caravan of kings behind ;
The time I well can call to mind,
I hadn't then been long a bride,
I gazed out from the open door,
Slowly his charger came this way ;
A little hat, I think he wore,
Yes, and his riding coat was grey.
I shook all over as quite near,
Close to this very door he drew—
"Good-day," he cried, "good-day, my dear!"
What, grandmother, he spoke to you,
He spoke to you ?

The following year I chanced to be
In Paris ; every street was gay.
He'd gone to Notre Dame to pray,
And passed again quite close to me !
The sun shone out in all its pride,
With triumph every bosom swelled ;
" Ah, what a glorious scene ! " they cried,
" Never has France the like beheld ! "
A smile his features seemed to wear
As on the crowds his glance he threw,
For he'd an heir, at last, an heir !—
Ah, grandmother, what times for you,
What times for you !

Then came for France that dreadful day
When foes swept over all the land ;
Undaunted he alone made stand,
As though to keep the world at bay !
One winter's night, as this might be,
I heard a knocking at the door ;
I opened it ; great heavens ! 'twas he !
A couple in his wake—no more ;
Then sinking down upon a seat—
Ay, 'twas upon this very chair,
He gasped : " Defeat ! Ah, God, defeat ! "
What, grandmother, he sat down there,
He sat down there ?

He called for food ; I quickly brought
The best I happened to have by ;
Then, when his dripping clothes were dry,
He seemed to doze awhile, methought.
Seeing me weeping when he woke,
"Courage," he cried, "there's still a chance;
I go to Paris ; one bold stroke,
And Paris shall deliver France ! "
He went ; the glass I'd seen him hold,
The glass to which his lips he'd set,
I've treasured since like gold, like gold !
What, grandmother, you have it yet,
You have it yet ?

'Tis there. But all, alas ! was o'er ;
He, whom the Pope himself had crowned,

The mighty hero world-renowned
Died prisoner on a far-off shore.
For long we none believed the tale,
They said that he would reappear,
Across the seas again would sail,
To fill the universe with fear!
But when we found that he was dead,
When all the shameful truth we knew,
The bitter, bitter tears I shed!
Ah, grandmother, God comfort you,
God comfort you!

MY GARDEN

This lovely little poem, sweetest of all swallow-flights of song about a garden, was penned by Thomas Edward Brown, the Manx poet. Born in 1830, T. E. Brown died in 1897. His poems were chiefly written about the people of the Isle of Man, their quaint ways and seafaring heroism.

A GARDEN is a lovesome thing, God wot!
Rose plot,
Fringed pool,
Ferned grot:
The veriest school
Of peace; and yet the fool
Contends that God is not.
Not God! in gardens! when the eve is cool?
Nay, but I have a sign;
'Tis very sure God walks in mine.

THE SHUT-EYE TRAIN

The poetry of Eugene Field is the quaintest and prettiest ever written for the entertainment of children, and The Shut-Eye Train is one of the most charming of them all.

We see the passengers to Shut-Eye Town on page 96.

COME, my little one, with me!
There are wondrous sights to see
As the evening shadows fall,
In your pretty cap and gown.
Don't detain
The Shut-Eye train—
"Ting-a-ling!" the bell it goeth,
"Toot-toot!" the whistle bloweth,
And we hear the warning call:
"All aboard for Shut-Eye Town!"

Over hill and over plain
Soon will speed the Shut-Eye train!
Through the blue where bloom the stars,
And the Mother Moon looks down,
We'll away
To land of Fay.
Oh, the sights that we shall see there!
Come, my little one, with me there—
'Tis a goodly train of cars—
All aboard for Shut-Eye Town!

Swifter than the wild bird's flight,
Through the realms of fleecy night
We shall speed and speed away!
Let the Night with envy frown—
What care we
How wroth she be!
To the Balow-land above us,
To the Balow-folk who love us,
Let us hasten while we may—
All aboard for Shut-Eye Town!

Shut-Eye Town is passing fair,
Golden dreams await us there;
We shall dream those dreams, my dear,
Till the Mother Moon goes down—
See unfold
Delights untold!
And in those mysterious places
We shall see belovèd faces,
And belovèd voices hear
In the grace of Shut-Eye Town.

Heavy are our eyes, my sweet,
Weary are our little feet—
Nestle closer up to me
In your pretty cap and gown;
Don't detain
The Shut-Eye train!
"Ting-a-ling!" the bell it goeth,
"Toot-toot!" the whistle bloweth,
Oh, the sights that we shall see!
All aboard for Shut-Eye Town!

LAND OF HOPE AND GLORY

Mr. Arthur Christopher Benson, the author of these lines, was the gifted son of an Archbishop of Canterbury, and one of three brothers who have won distinction. Mr. Benson was born in 1862 and died in 1925. He wrote many poems, and in these verses has deserved a nation's thanks, for we should all be grateful to a man who sings so nobly of our land. The poem is set to music by Sir Edward Elgar

DEAR Land of Hope, thy hope is crowned,
God make thee mightier yet!
On Sov'ran brows, beloved, renowned,
Once more thy crown is set.
Thine equal laws, by freedom gained,
Have ruled thee well and long;
By freedom gained, by truth maintained,
Thine Empire shall be strong.

Thy fame is ancient as the days,
As ocean large and wide;
A pride that dares, and heeds not praise,
A stern and silent pride;
Not that false joy that dreams content
With what our sires have won;
The blood a hero sire hath spent
Still nerves a hero son.

Land of Hope and Glory, mother of the free,
How shall we extol thee who are born of thee?
Wider still and wider shall thy bounds be set;
God, who made thee mighty, make thee mightier yet.

ONLY A BABY SMALL

The writer of these charming lines, ending with a note so tender, was Matthias Barr, a Victorian verse-writer for and about children. He was born in Edinburgh in 1831, of German parents, and his spirit was bright and gentle

ONLY a baby small,
Dropped from the skies;
Only a laughing face,
Two sunny eyes.

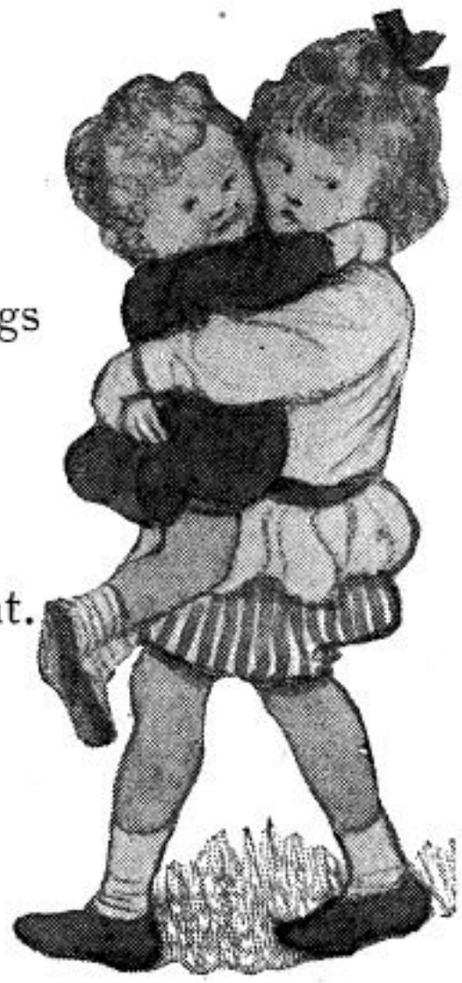
Only two cherry lips,
One chubby nose;
Only two little hands,
Ten little toes.

Only a golden head,
Curly and soft;
Only a tongue that wags
Loudly and oft.

Only a little brain,
Empty of thought;
Only a little heart,
Troubled with naught.

Only a tender flower
Sent us to rear;
Only a life to love
While we are here.

Only a baby small
Never at rest;
Small, but how dear to us
God knoweth best.



THE TWENTY-THIRD PSALM

The Psalms of David in the Bible are among the finest poetry we can read. Many of the other books in the Bible are also poetic in form, but we do not usually think of them as poems. They are not in verse. More than two hundred years ago a Poet Laureate, named Nahum Tate, re-wrote them with rhyme, and his verses are still sung; but he was a poor poet. Joseph Addison was a far greater man, and the 23rd psalm is here given as turned into verse by him.

THE Lord my pasture shall prepare,
And feed me with a shepherd's care;
His presence shall my wants supply,
And guard me with a watchful eye;
My noonday walks He shall attend,
And all my midnight hours defend.

When in the sultry glebe I faint,
Or on the thirsty mountains pant,
To fertile vales and dewy meads
My weary, wandering steps He leads,
Where peaceful rivers, soft and slow,
Amid the verdant landscape flow.

Though, in a bare and rugged way,
Through devious lonely wilds I stray,
Thy bounty shall my pains beguile;
The barren wilderness shall smile,
With sudden greens and herbage crowned,
And streams shall murmur all around.

Though in the paths of death I tread
With gloomy horror overspread,
My steadfast heart shall fear no ill,
For Thou, O Lord, art with me still:
Thy friendly crook shall give me aid,
And guide me through the dreadful shade.

PIPING DOWN THE VALLEYS WILD

William Blake, the famous English poet, has always a touch of the mystical and imaginative even in his simplest verses, and this poem is no exception to the rule. What the poet means to suggest to us is the inspiration of the true singer of Nature, whose written poems should be as much in tune with Nature itself as the imaginary piper who here turns a reed into a pen to write down for ever the songs he has been piping.

PIPING down the valleys wild,
Piping songs of pleasant glee,
On a cloud I saw a child,
And he, laughing, said to me:

Pipe a song about a lamb.
So I piped with merry cheer,
Piper, pipe that song again;
So I piped: he wept to hear.

Drop thy pipe, thy happy pipe;
Sing thy songs of happy cheer.
So I sang the same again,
While he wept with joy to hear.

Piper, sit thee down and write
In a book that all may read.
So he vanished from my sight;
And I plucked a hollow reed,

And I made a rural pen,
And I stained the water clear,
And I wrote my happy songs
Every child may joy to hear.

LIGHTS OUT

When General Sherman, a hero of the American Civil War, died, these verses were written in commemoration of him by C. H. Adams, a fellow-countryman. The verses were appropriately read at the funeral of the author.

THE strenuous day is past,
The march, the fight;
The bugle sounds at last
Lights out. Good-night!

The sky is white with stars;
The tents gleam white;
Tired captain from the wars
Sleep through the night.

Sleep till the shadows take
Their endless flight,
Until the morning breaks,
Good-night! Good-night!

LITTLE VERSES FOR VERY LITTLE PEOPLE

A LITTLE KINGDOM I POSSESS

A LITTLE kingdom I possess,
Where thoughts and feelings dwell ;
And very hard I find the task
Of governing it well ;
For passion tempts and troubles me,
A wayward will misleads,
And selfishness its shadow casts
On all my will and deeds.

How can I learn to rule myself,
To be the child I should,
Honest and brave, nor ever tire
Of trying to be good ?
How can I keep a sunny soul
To shine along life's way ?
How can I tune my little heart
To sweetly sing all day ?

Dear Father, help me with the love
That casteth out my fear ;
Teach me to lean on Thee, and feel
That Thou art very near ;
That no temptation is unseen,
No childish grief too small,
Since Thou, with patience infinite,
Dost soothe and comfort all.

Louisa M. Alcott

WILLIE'S LODGER

TWO little boys named Willie
Live in the house with me.
One is as good a darling
As ever I wish to see ;
His eyes are glad, his smile is sweet,
His voice is kind, his dress is neat,
And he is the boy for me.

This Willie says : " Good-morning ! "
Happy as any bird ;
A merrier laugh, a lighter step,
No mortal ever heard.
" Thank you," he says, and " If you please ? "
He will not pout, he will not tease—
Oh, he is the boy for me !

The other Willie, sad to say,
Is very, very bad ;
I think he is as cross a child
As ever a mother had.
" Go 'way ! " he shrieks. He squalls and cries ;
The angry tears oft fill his eyes—
He is not the boy for me.

He lingers round my Willie,
And whispers evil things.
Oh, how we dread him ! For we know
The sin and grief he brings.
Who keeps him, then ? Why, Willie s self ;
He keeps this wicked Willie-elf
Who is not the boy for me.

If I were you, my Willie,
I'd make him stay away—
This boy who grieves your mother
And spoils your brightest day.
For he lives in you where he doesn't belong,
So oust him, Willie ! Send him along !
" Clear out ! " I'd say, " old Fume and Fret !
This heart of mine is not to let—
You're not the boy for me ! "

Mary Mapes Dodge

TRY AGAIN

TIS a lesson you should heed,
Try again ;
If at first you don't succeed,
Try again ;
Then your courage should appear,
For if you will *persevere*,
You will conquer, never fear,
Try again.

Once or twice though you should fail,
Try again ;
If you would at last prevail,
Try again ;
If we strive, 'tis no disgrace
Though we do not win the race ;
What should we do in that case ?
Try again.

If you find your task is hard,
Try again ;
Time will bring you your reward,
Try again ;
All that other folk can do,
Why, with patience, may not you ?
Only keep this rule in view,
Try again.

William Edward Hickson

THE WORM

TURN, turn thy hasty foot aside,
Nor crush that helpless worm !
The frame thy wayward looks deride
Required a God to form.

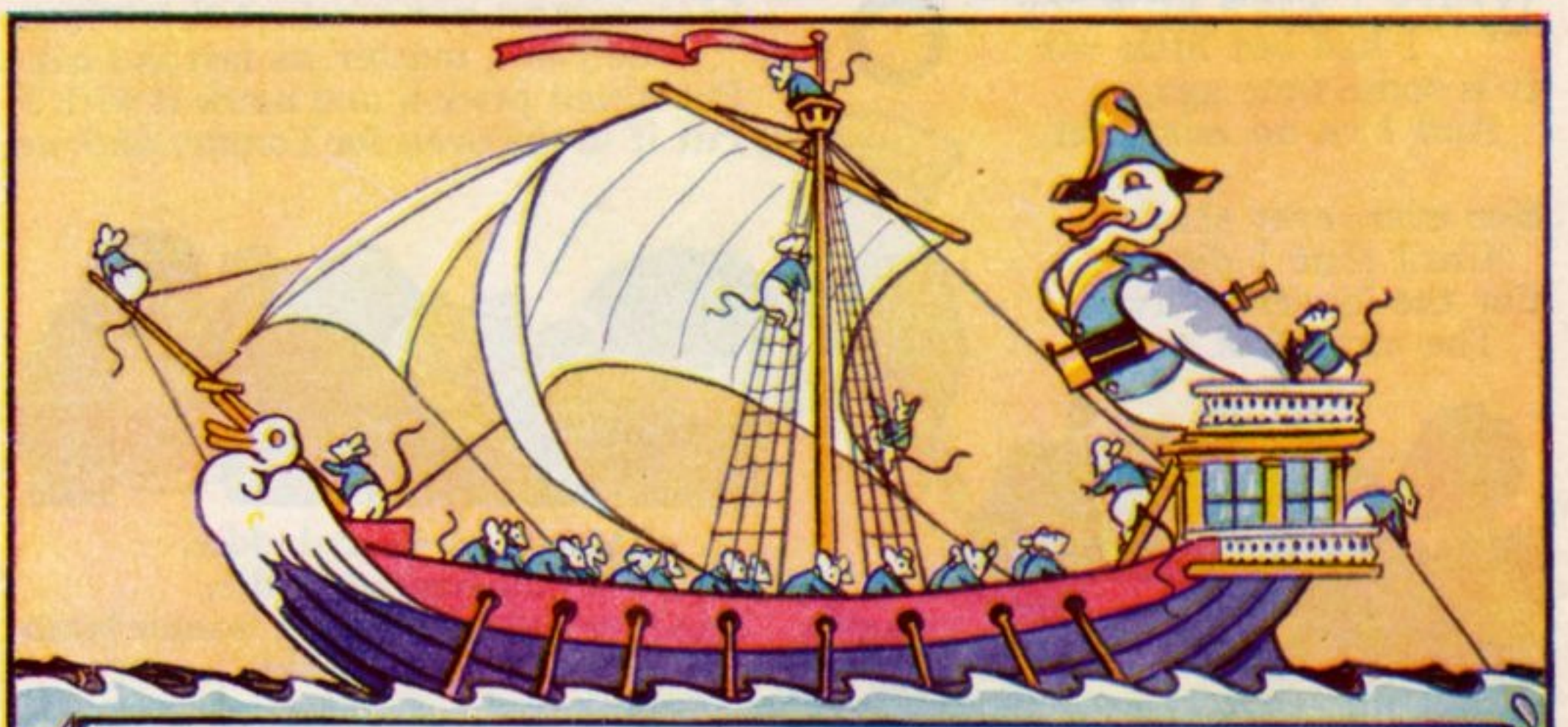
The common lord of all that move,
From whom thy being flowed,
A portion of His boundless love
On that poor worm bestowed.

The sun, the moon, the stars, He made
For all His creatures free ;
And spread o'er earth the grassy blade
For worms as well as thee.

Let them enjoy their little day,
Their humble bliss receive ;
Oh ! do not lightly take away
The life thou canst not give !

Thomas Gisborne

I SAW A SHIP A-SAILING



I saw a ship a - sail - ing, a - sail - ing on the sea, - - And it was deep - ly la - den with pret - ty things for me. There were rai - sins in the cab - in, and al - monds in the hold The sails were made of sa - tin, And the mast was made of gold.

THE four and twenty sailors
Who stood upon the decks
Were four and twenty white mice
With rings about their necks.

THE captain was a duck, a duck,
With a jacket on his back,
And when the faery ship set sail
The captain he said Quack!

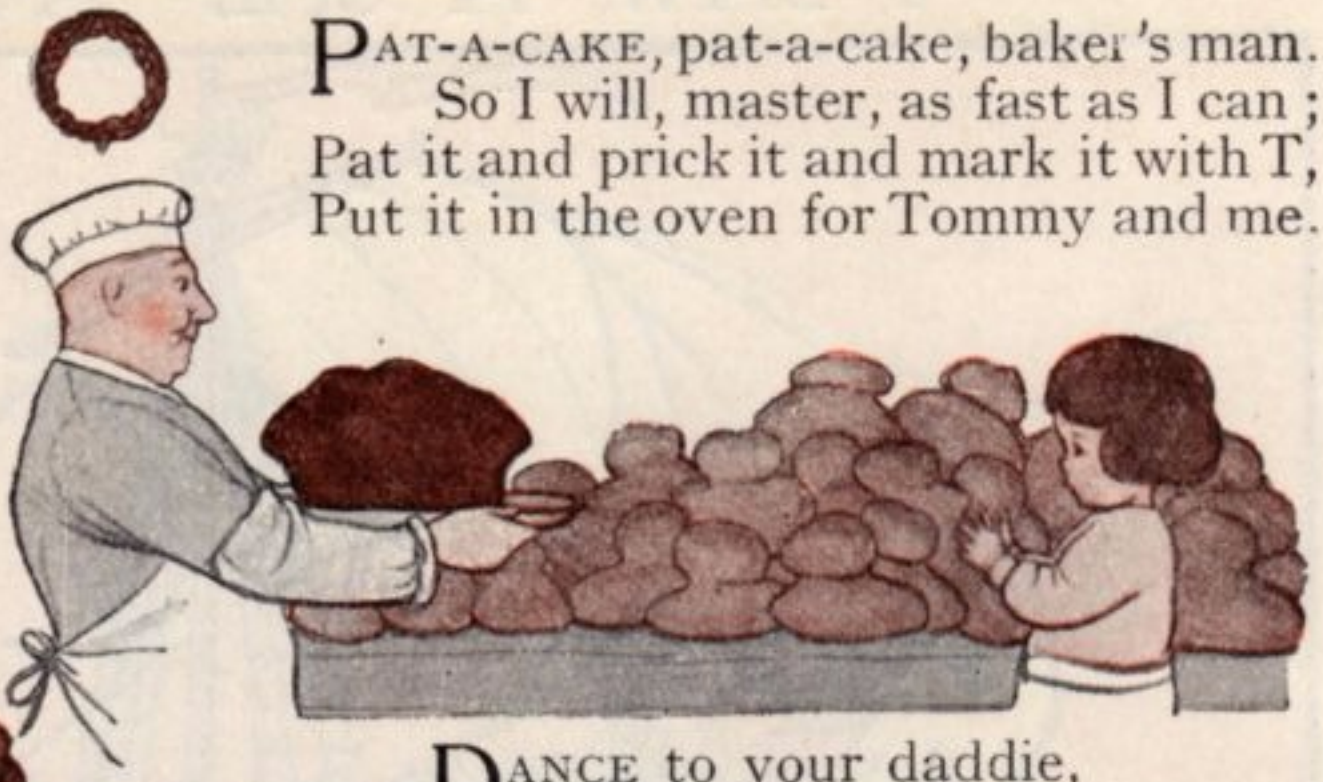
When I was a little boy,
I had but little wit ;
It is some time ago,
And I've no more yet.

Nor ever, ever shall,
Until that I die ;
For the longer I live
The more fool am I.

Pretty maid,
Pretty maid,
Where have you been ?
Gathering a posie
To give to the Queen.

Pretty maid,
Pretty maid,
What gave she you ?
She gave me a diamond
As big as my shoe.

As I walked by myself,
And talked to myself,
Myself said unto me :
Look to thyself,
Take care of thyselt,
For nobody cares for thee
I answered myself,
And said to myself,
In the selfsame repartee :
Look to thyself,
Or not look to thyselt,
The selfsame thing will be



Pat-a-cake, pat-a-cake, baker's man.
So I will, master, as fast as I can ;
Pat it and prick it and mark it with T,
Put it in the oven for Tommy and me.

Dance to your daddie,
My bonnie laddie,
Dance to your daddie, my bonnie lamb!
You shall get a fishie,
On a little dishie,
You shall get a herring when the boat comes hame !

Dance to your daddie,
My bonnie laddie,
Dance to your daddie, and
to your mammie sing !
You shall get a coatie,
And a pair of breekies,
You shall get a coatie when the boat comes in !

Handy Pandy, Jack-a-dandy,
Loves plum-cake and sugar-candy ;
He bought some at a grocer's shop,
And out he came, hop, hop, hop, hop.

OLD MOTHER HUBBARD

Old Mother Hubbard
Went to the cupboard
To get her poor dog a bone;
But when she got there
The cupboard was bare,
And so the poor dog had none.

She went to the baker's
To buy him some bread,
But when she came back
The poor dog was dead.

She went to the joiner's
To buy him a coffin,
But when she came back
The dog he was laughing.

She took a clean dish
To get him some tripe,
But when she came back
He was smoking his pipe.

She went to the fishmonger's
To buy him some fish,
And when she came back
He was licking the dish.

She went to the ale-house
To get him some beer,
But when she came back
The dog sat in a chair.

She went to the tavern
For white wine and red,
But when she came back
The dog stood on his head.

She went to the hatter's
To buy him a hat,
And when she came back
He was feeding the cat.

She went to the barber's
To buy him a wig,
But when she came back
He was dancing a jig.

She went to the fruiterer's
To buy him some fruit,
But when she came back
He was playing the flute.

She went to the tailor's
To buy him a coat,
But when she came back
He was riding a goat.

She went to the cobbler's
To buy him some shoes,
But when she came back
He was reading the news.

She went to the sempster's
To buy him some linen,
But when she came back
The dog he was spinning.

She went to the hosier's
To buy him some hose,
But when she came back
He was dressed in his clothes.

The dame made a curtsey,
The dog made a bow;
The dame said, "Your servant,"
The dog said, "Bow-wow!"

SIMPLE SIMON MET A PIE-MAN

SIMPLE SIMON met a pie-man
Going to the fair :

Said Simple Simon to the pie-man,
" Let me taste your ware ! "

Said the pie-man to Simple Simon,
" Show me first your penny ! "

Said Simple Simon to the pie-man,
" Indeed, I have not any ! "

The Story of Where Power Comes From, What It Does, & How It Works

What This Story Tells Us

MAN has magnified his powers a millionfold. What a wonderful world there comes to mind as we think of electricity—its waves spreading themselves about the world innocently and invisibly until they touch a thing that man has made, and, lo, there is power to drive our ships and trains and light our cities. And what a vision of the past comes as we think of oil, lying buried in the earth a million years and more to come bursting out at last to turn half the wheels of Europe. Out of the past, also, comes coal. Is it not strange to think of coal growing as a great green plant? Yet so it was. Here we shall read of all the sources of power that men have found, and of all the mechanical powers they have invented. We shall have wireless explained, the telegraph and the telephone, the motor-car and the aeroplane, ships and trains and engines of all kinds.

THE VERY HEART OF MATTER

THOUSANDS of years ago, in a certain part of the world, shepherds noticed with curiosity that bits of rocky mould clung to the crude iron hooks of their crooks. In other climes men bedecked with amber beads had noticed, with the same mere curiosity, that these beads when rubbed against their garments would sometimes attract little bits of straw or silk, which clung to the amber through some mysterious force.

These two forces were magnetism and electricity, which today have revolutionised the world, and have made the wizardry by which the voice is carried round the Earth, by which a waterfall will drive a train or light a town, and by which the common clay is turned into shining aluminium.

Electricity is the heart of matter, for recent discoveries have shown beyond all doubt that everything in the world consists of minute particles called atoms, themselves composed of tiny specks of negative electricity called electrons, which are held together by a central bond of positive electricity. Electricity is the great secret that matter has held within it for millions of years and we now know that it has weight and *is* matter. As far as our Earth is concerned, electricity in one form or another has proved to be the sole material used by the Creator in building up its fabric.

The miracle of electricity is thus around us every day, every instant. The world, revolving round the Sun with the other planets which form the Solar System, is a tiny speck in the vastness of space; but space itself is filled with a rare material which, because we can think of no better name, we call ether. The invisible ether is capable of being thrown into agitation just as water is if it be beaten up with a stick or disturbed by a stone thrown into it. The water of a lake may become calm and still when there is no wind to disturb it, but the ether is always in a condition of unrest.

Waves of millions upon millions of different sizes and forms are continually passing through it. The light of the sun, the heat from the kitchen fire, wireless signals and X-rays, all come from these waves, some so tiny that millions of waves go to an inch, others so long that they reach twenty miles from crest to crest. But they all travel with uniform speed through the ether, three thousand times as far in a second as an

express train goes in an hour ; their only real difference is the number of them which follow each other in a wave-train and pass a given point in a second of time.

Let us leave these ether waves for a while, and see what has come of the discovery of this all-pervading force in Nature.

We live essentially in an age in which we have learnt how to change the form of power. A mighty waterfall like Niagara represents natural power which for thousands of years has been running to waste ; today men have turned it from a useless, churning, boiling mass of spray into a force which *produces*. The swiftly flowing water is directed through a water-wheel spinning round at an incredible rate. Fixed to the shaft of the turbine is a machine that converts mechanical power into electricity. This electricity is conveyed through the ether along copper wires, which guide it to some given spot, perhaps a hundred miles off, where it arrives ready for conversion into useful power, perhaps at a mine.

THE MOTOR THAT CHANGES ELECTRICITY INTO MECHANICAL POWER

Here the electricity is changed back into mechanical power again, by means of another invention of quite recent times—the electric motor. The current flows round the magnets of a machine, within which is what we call an armature, and this armature is forced to revolve by the electric force. The motor drives all kinds of machinery. It works the cages which take the miners down into the bowels of the earth and bring them up again. It drives their machines ; it provides them with light.

Near by may be a foundry, where broken masses of ore are turned by the furnace into molten metal, and huge ingots of iron are cast—far too heavy for a man to handle. These are picked up by an electric magnet, an iron hand which, under the spell of electricity, possesses giant strength, and lifts up ten tons of metal as if it were a feather. Remember that all this work, the driving of the machines, the making of the light, the lifting of the heavy mass of metal, is still the work of the waterfall a hundred miles away.

Some of this iron is turned into useful articles ; bicycle handles, perhaps. These are brightly nickel-plated, and this silvery coating of nickel is put on the steel by means of an electric current. Electricity silvered the spoons and forks with which you eat every day of your life. We cannot get away from its power and results. The tram we ride in is driven by electricity ; the light we read by is made from it. Every time we press a button and ring a bell we set electricity in motion. Every time we talk with someone on the telephone, or send a telegram, we use electricity. Life as it is today could not go on for a moment without it.

HOW NATURE HAS BEEN USING ELECTRICITY FOR AGES

The development of eiectricity has been remarkably rapid in our time. But for thousands of years after the first signs of the existence of electricity men did no more than look upon them with wonder or curiosity. But through all these ages Nature had been using electricity, stimulating with it, for example, the growth of plants, every one of which is provided with tiny hair collectors like miniature lightning conductors, collecting the atmospheric charges that play such an important part in the chemistry of plant growth. The Chinese were the earliest to make use of magnetism, constructing crude compasses which helped them to guide their ships long before the North and South Poles were known.

Then a hundred years ago a greater interest was taken in these natural phenomena. Men studied magnetism. Some attempt was made to offer an explanation of the curious things that had been noticed. But no notion existed of the marvellous future of electricity, or of the intimate part it was to play in the life of the nations. Even a hundred years ago it would have seemed fantastic to think of two men a hundred yards apart talking by electricity, yet today a man in England can ring up another one in Australia and talk to him on the telephone.

WHEN MEN BEGAN TO THINK ABOUT THE WONDERS THEY SAW

About a century ago, when knowledge had reached the stage at which men began to look round for a reason for anything remarkable that they observed, there came the realisation that these forces could be imitated, and produced by themselves, and even controlled. The age of scientific experimenting had begun, the age of thinking had arrived.

Many foolish theories were formed at first, many an explanation found for the curious things that happened, which afterwards proved to be wrong ; but, as time went on, the real truth was gained largely by the endeavours of others to disprove these earlier theories. The age of real science had

begun, when facts were the only things that counted, and soon philosophers in different parts of Europe, but notably in England, France, and Germany, contributed bit by bit to a knowledge of electricity and magnetism on which the world of today so largely depends.

We might turn the power of a mighty steam-engine, of a million horse-power waterfall, into electricity; but how is it to be distributed to those who want it for light, heat, or power? These were great problems which have been solved in a truly wonderful way.

THE POWER IN THE WIRES THAT LIE UNDER OUR FEET

At each large generating station is a switchboard from which pass the cables that carry the current to the factories, the trams, and the homes of the people. How does the electrician arrange that a tram wanting a hundred horse-power for its motors shall have a hundred horse-power, and the lamp wanting only a tiny fraction of this power to make it glow shall have just what it requires?

Under your feet as you walk along the street is a maze of wires. Some of these carry enormous power to the factory or the electric tramway, others carry the feeblest of currents that are carrying telephone or telegraph messages. Overhead are more telegraph wires, guides merely to lead the electric current through the ether to some far-off town, and in the space above the telegraph wires are countless electric waves conveying speech, music, and entertainment to our homes. An electric car drives past; it has its own supply of electricity, virtually bottled-up in a box containing a storage battery, in which enough power is stored to drive it perhaps for fifty miles.

THE FLOOD OF LIGHT A TOUCH CAN BRING FORTH

Think how you start the electric bell ringing by a touch of the finger; how a child can turn on a switch and flood a room with light. A thousand horse-power is set in motion by the touch of a lever; a dozen people are swiftly carried in an electric lift to the top of a high building by pressing a button. It is magic, the natural magic of electricity, so subtle that the light from a star a million million miles away can be made to set it in operation by means of a very sensitive electric cell.

There is a whole world of romance in the way in which electricity is created, stored, and transported to a distant spot. The submarine cable is a good example. Numbers of wires lie along the bottom of the Atlantic Ocean, for example, through which flow the telegraphic currents by which England speaks with America. The feeblest currents only can be sent through these long cables, and the most delicate instruments are required for receiving.

Today, busy as the cables are, we are sending other telegraph messages all over the globe by wireless. Ships and aeroplanes can find their bearings in foggy weather by that great invention the wireless compass, a heaven-sent safeguard to the modern navigator. The fact that selenium is sensitive to light was discovered by cable layers in the Atlantic, and this discovery led to others which have given us a new power, the electric control of machinery by *light*. The fact that we can turn light into electric power has brought about that modern marvel the talking picture, and has made it possible for a ray of light reflected from a mirror mounted on an express train to bring the train to a standstill if the signals are against it.

THE ELECTRIC WAVES THAT FILL YOUR BEDROOM EVERY NIGHT

One marvel has followed another with almost incredible rapidity; the one that appeals to most of us more than any other is the sending of electric power through space without wires. A few years ago Marconi sent a wireless message a few hundred yards, shortly afterwards a mile or two, then across the Channel, then across the Atlantic; now a telegraphic message can be sent round the world. A wireless signal will, in fact, encircle the globe in the fifth part of a second.

When we lie asleep in bed the room is full of these waves. Some of them can pass through the walls, through our bodies. A drop of water will spread in a piece of blotting-paper because it can penetrate between the tiny specks of the paper. A lump of sugar will suck up a certain amount of water without increasing in size, because the water finds its way into the tiny spaces between the molecules of which the sugar is composed. The ether finds its way everywhere, and permeates everything. It is in the spaces between the atoms that make up everything, so

that there is a *continuity* of this invisible medium everywhere.

The fact that the atoms in a substance are arranged in an orderly manner in planes, and that these planes will reflect X-rays, has made it possible by X-ray photography to discover the exact structure on which substances are built up. In this way electricity has provided us with a new means of analysing materials, and has in itself produced a revolution in engineering and the study of metals.

THE WONDERFUL THING THAT PICKS UP MUSIC OUT OF SPACE

A wireless wave is often of great dimensions, and an obstacle like a house will only baulk a part of it in its progress, but everywhere in its path the ether is in motion. Put a wireless receiver into a room, and if it is sensitive enough it will pick up a human voice, a piece of music, or a song sent from a distant spot. With waves of light, heat, or wireless the ether is never at rest, and thus we go about our daily life in the home, or in the office, in the school or the street, surrounded by, immersed in, a vast sea of electric waves.

More wonderful perhaps than wireless itself is the revelation that every substance we know of is itself composed of electricity. As we shall see, there are two kinds of electricity, positive and negative, and we have discovered during the last few years that Matter itself, the stuff of which the world is made, is nothing more than a simply organised mass of positive and negative particles.

ECONOMIC DEVELOPMENT UNDER THE GRID SYSTEM

One of the greatest changes in our modern life has been brought about by the grid. A quarter of a century ago a famous President of the Institute of Electrical Engineers suggested that we should convert the coal where it was brought up from the mines into electrical power. There were a hundred reasons at the time why the dream could not be realised, but the dream has been realised during the last few years, and today electricity is generated at selected spots where coal is cheap and is transmitted to various parts of the country, to railways, factories, mines, towns, and cities by means of the overhead lines which convey current at the enormous voltage of one hundred and thirty-three thousand. With the amazing progress that has been made in electric lamps themselves, and in the devices for converting electricity into heat and power, the whole future outlook has been altered; light and power will be available on a remarkably economical scale, and electricity will be used universally.

The greatest marvel of electricity is the wondrous variety of states in which it exists. First of all it is the common source from which everything is derived. Then it exists in a *static* state, as in the electric charge in a thundercloud. In an instant it turns to a blinding flash of lightning, releasing fifty million horse-power for a brief fraction of a second. It exists as an electric current, which can be controlled with the utmost exactness and made to drive a simple sewing-machine or a mammoth ship. We can make it give just sufficient heat to boil an egg or to produce the intense heat of the electric furnace, in which the chemist can melt substances that refused to melt in the hottest furnace known before.

THE COMING OF TELEVISION, YOUNGEST OF ALL THE SCIENCES

The electric wave can weave its path through the hardest steel and produce on a photographic plate an image of a flaw or a crack in the iron of an engine. In the form of X-rays these waves saved the lives of thousands of men in the European War. Today the X-rays are among the most powerful allies of medicine.

New uses for electricity are being found day by day. A few years ago the visitor to a shipyard would be impressed by the familiar noise of the hammers of the riveters. Riveting is fast dying out, and the steel plates of modern ships, bridges, and other structures of all kinds, are being welded together by the intense heat of an electric current.

Perhaps most wonderful of all the things that electricity has done for us is in the field of television, the youngest science of all, which enables us to see things happening at a distance of hundreds of miles. It is actually a fact today that an aeroplane flying ten thousand feet above a battlefield could telegraph a moving picture of the engagement to the War Office in London. The Navigating Officer of a ship can see by television the image of an oncoming ship in the densest fog; and this, added to what the wireless compass can do, makes sea travel in foggy weather almost perfectly safe.

Imperishable Thoughts of Men Enshrined in the Books of the World

What This Story Tells Us

OH for a book and a shady nook! a man cried long ago, and in truth there is nothing to equal a book. Nothing has been able to stop the men who write books. Tyrants have burned their books and writers have been tortured by fire, but books have spread themselves throughout the world so that there is no land on Earth without them now. They are the only things that live for ever, for new copies are made as old ones pass away, and so through all the ages of time a book carries down the thoughts of men. A thought put into a book is stronger than a statue carved in marble, and in the story of mankind the book has been the mightiest and noblest invention conceived by the human mind. The man who writes a book can laugh at Caesar and Napoleon ; they perish while he lives on. Here we shall look at the writers of the world and what they wrote about.

THE REALMS OF GOLD

WE are to go together on the rarest journey ever made by the mind of man through the wonderful treasure land of Literature, the glorious world of books, and with them to enjoy delights the greatest and the easiest that are within the reach of all of us.

To say that this is possible is no vague promise. The master impulse of youth is curiosity—to see and hear and know more about the world into which it has been born, to feel and think and do more, and hour by hour take to itself a larger share of life. And this it does first, as a child, by observation, and then by activity and widening experience. But soon the child finds, or should find, that through books it can reach out, by its mind, far beyond the pleasures and knowledge it can attain through its bodily activities. And so it will be to the end of its days, however long it may live, if once it can feel the joys that await it in the great realm of bookland. We want here to make some of those joys felt by anticipation.

All that has ever been known and felt by men, everywhere, in all the years that have been, is probably treasured up somewhere in books, marvellously preserved for our use and delight. Books live and tell us of the past when most other things have faded away.

SHAKESPEARE

Into books men have put their very souls as they have longed to speak their highest and dearest thoughts to those who will follow them, and perchance be influenced by them, in long distant future ages. What the world has been is embalmed in books, and the passionate hopes of men for what it may be are there passed along as an everlasting inheritance for the human race.

For, on the whole, it is the best that lives in books and retains an unending power, while what is evil or what is feeble perishes and is forgotten ; and so the great permanent accumulation of books which is known as Literature is constantly growing nobler—a vital essence distilled from the mass of men's writings.

It is because books have this splendid cumulative power, age beyond age, that the great writers of them are so deeply honoured. They do not belong to their own period, but to all time. They may shape the minds of innumerable millions.

In the end no man has an earthly immortality except through books. The

most stupendous men of action are only known at last by what has been written of them in books.

It is, then, no little thing that we do when we set out through the land of books and try to feel what can be found there that is noble and inspiring, delightful, cheering, comforting, and enduringly wise.

Happily, a large part of the world's riches in literature, the books that move our spirits deeply by their truth or beauty or romance, are to be reached through a knowledge of the English tongue. Our language is a gateway to this treasure-land.

THE BOUNDLESS RICHNESS OF THE KINGDOM OF BOOKS

Think of the boundless breadth and richness of the region we are to wander in. Our great English poet John Keats called it the realms of gold, and pictured the reader as a traveller. So he is, for the kingdom of books has many provinces, each tempting us to enter in.

There is, for instance, the wide region of knowledge, the books which gather up and hold in trust for us all the wisdom and skill that generations of men have won.

There is the far-reaching field of history, a vast expanse, enthralling to the observant reader, beginning with fragments from the dim past, all pieced together by careful, imaginative thought. Then come legends that have passed along the centuries from memory to memory, the tales of long ago that are one of the chief fountains of the world's poetry, and existed in outline before writing began.

With writing came more flowing narratives; the picturing of the characters of men and women who made a deep impression on others; the stately records of great events; the familiar jottings of biography; the virtues of some leaders of men and the sins of others; the movements of the many, as they were drawn on by hope or driven by despair; the successes and failures in forms of government; the oratory that pleads for justice and forms men's opinions—all these things have found a record in books.

THE THOUGHTS THAT HAVE FLASHED THROUGH MEN'S MINDS IN THE AGES

But not only do books, the mind's realms of gold, tell of the knowledge men have gathered slowly and picture the varied story of all that has been; they treasure up for us also the imperishable and beautiful thoughts that have flashed into men's minds throughout the ages, and, being captured and expressed in lovely words, remain as guides, and awaken in us noble impulses to be good, and to spread happiness among mankind.

Through books, again, we may increase enormously our knowledge of life, seeing more of it in our minds than ever we are likely to see by our own observations. That is the chief use of novels. If novels picture life truly, they enlarge our range of vision and experience. If they do not picture life faithfully and wisely they mislead and deceive us, and have a bad influence.

In stories that are truthfully imagined, and choicely told, we may see family life, the tenderness of parentage, the sweetness of childhood, the pleasant claims of kinship, the faithfulness of true friendship, the romance of love, and the firm bond of duty. Or we may penetrate the secret history of the individual soul, its high endeavours, its stern endurance, its clashing passions and rivalries, its thirst for adventures and thrilling conquests, its selfless heroisms, its bold face turned to misfortune, its eager inquiries, patient virtues, its hushed reverence before what is good and beautiful. Yes, truthful fiction fills a large place in these realms of gold.

THE HOMES OF THE FAIRIES, FAYS, NYMPHS, GNOMES, DROLLS, AND GENII

It is largely in fiction that humour and laughter, those unfailing sweetnesses of life, are found. No gratitude can be too great for a combination of a humorous eye, seeing life's oddities and loving them, with a cheerful face and a tender heart. That kind of character has made itself felt in books outside of fiction, but it shows itself with much more freedom in stories.

In them are treasured for ever the gladsomeness of spirit that is seen and heard in the merry laughter and rollicking fun of the young, in the quiet smiles of the strong, and the mellowed, humorous wisdom of the aged. The world's humour is all around us in life, waiting for us to see it, but it is also condensed in the best fiction, and the observing eye is there taught what to see that will lighten the heart, and also how to see it.

It is in books, too, that we find the airy traceries of fancy which men, women, and children have been shaping since the human world began, images woven by the mind, with threads as delicate as the gossamer that bedecks the morning dew,

yet so beautiful that they will endure for ever. In this region live imaginary creatures seen and felt by millions as if they were realities—the fairies, fays, nymphs, and gnomes, the drolls and genii, the giants and monsters that once peopled the world born of the perplexed guesses of simple ignorance and fear ; the legends made out of the half-forgotten materials of fading history ; the ever-increasing riches of imagination that never were life, yet may be as true to life in their effect on us as if they were actual events.

THE POETRY THAT ADORNS OUR LANGUAGE FOR EVER

And now, in our glance through the realms of gold, we are led to poetry, the choicest part of that wide territory. Poetry is present, more or less, in every nook of literature, though it also has a place of its own. It keeps step by step with advancing knowledge. It turns history into song. It inspires the lover of Nature, the patriot, and the saint. It gives their clearest voice to Life and Love and Laughter ; and Fancy is its dainty attendant. It is the finest expression in words of the soul of man. And so the most wondrous wealth of interest that awaits us as we travel through the world of books will be found in the poetry which, above all other writing, adorns our English language everlastingly.

We have tried to suggest how wide and welcoming and attractive is the great range of reading that we call our English Literature ; perhaps we may add a word as to how to approach and enjoy it.

In finding out what is delightful in books, we must never think we can know what is worth knowing by being only told about it. We must know the books themselves. We must enjoy ourselves and those things in a book that give it life and beauty.

A FINGER-POST TO THE HIDDEN TREASURE OF BOOKS

Whatever may be written here will be a finger-post pointing the way to the treasures of the realms of gold, but each one of us must make the journey and seek the treasure. A guide may say what to expect. He may quicken anticipation by promises of what can be found ; he may show specimens ; but if even every word a guide says is remembered, the reader will have failed unless the book itself is read.

Of course it is helpful to know a good deal about the interesting people who have written the books that make up our fine English literature. The more we know of the times in which they lived, and the circumstances in which they wrote, the better we shall understand their books. Also some directions about the purpose of a book are useful. Then we may like to know how other readers of a thoughtful kind have regarded the book, and so books about books may be welcomed rather than avoided. But from out of our own mind our opinion should come, through our reading of the book. It is only when we have seen with our own eyes, or heard with our own ears, the message sent forth in a book, in the form and with the accent the author gave it, that we can say we know the book.

One of the uses of any book, whether it be simple or great, is that it is an exercise in judgment for ourselves. We should not read to criticise with cold reproof, but to see what there is in a book that will attract, reward, and delight us. And we must remember, if we are not attracted by a book that many praise, that it is quite possible the fault is in ourselves. Some great books may not attract us at first, and we may leave them for a later reading, when we pass that way again.

LET US BE HONEST WITH OUR BOOKS, AND NOT PRETEND

Let us be honest and not pretend we like what we do not really care for. But let us not be hasty and condemn what we have failed to understand. Even things of beauty do not always dawn brightly on us at once ; many people have wondered, as they have grown up, how they could have missed enjoyments in books which might have been theirs years ago. The truth is that they were not ready for them.

The reading of the finest books should never become a task. It should be a natural delight. In that spirit all the bes books were written, and in that spirit they should be read. Then reading becomes the chief source of pure delight, the happiest of habits, pleasing us greatly while it enriches our minds.

What we wish to do here is to help our readers to extract from books their choicest essences, as the bee extracts honey from the flowers. Books that have delighted men for hundreds and thousands of years must have rare essences of thought and feeling in them, or they would have been neglected and forgotten. We will wander with our readers in search of such books, to discover their inmost spirit, and enjoy together their unfailing charm.

MOVING, MOVING, SINCE CREATION

FOR EVER THE WINDS BLOW, FOR EVER THE WATERS MOVE; NOT FOR ONE MOMENT SINCE CREATION HAVE THEY BEEN STILL

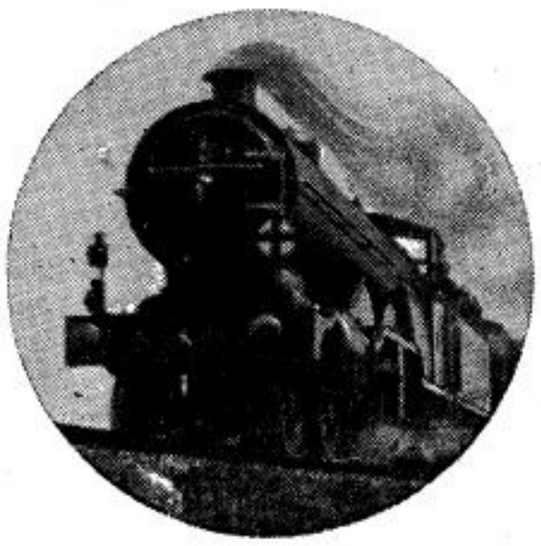
The Great Words that Stir the Hearts and Minds of All Mankind

What This Story Tells Us

HOW wonderful and how solemn are the words we speak! They come down to us out of the life of the past full of meaning and of mystery, often stirring great emotions in us as we think of them. One of our great poets used to say that he could never think of the words "far, far away" without a tear in his eye. So, as we grow up, the time comes when we can hardly think of great and noble words without a thrill vibrating through our being. To those who know something of the vastness of the universe the word Distance brings a thrill. To those who think of man's long fight for freedom the word Liberty brings a thrill. And so it is with many words. Here we shall talk about the really big words in our language, and consider what they mean and what thoughts they stir within us. They are like milestones in the march of life and learning.

MOVEMENT

IN waking from sleep it is said that movement almost always precedes sensation. We move first; then we feel that we are waking up. There is a tremble of the body, then a tremble of the mind.



Movement precedes everything we know. There could have been no Earth without movement, no universe, no life. But for the movement of the ocean there would be no health on this planet. But for the movement of the seed there would be no grass. But for the movement of man's brain there would be no history.

One of the most striking phrases in the great story of Creation as told by Moses comes at the opening of that immortal epic. *In the beginning God*—— and then, after the thought of Creation enters the Divine Mind, "the Spirit of God *moved* upon the face of the waters."

We all make use of this word: it is one of the commonest words of tongue and pen. But how many of us stop to think what this word means, how long a history it has, and how greatly it helps us in trying to understand the riddle of existence?

One of our greatest men of science has laid it down that man's sole occupation on this Earth is moving things from one place to another, shifting matter about, arranging it or re-arranging it. We once told him that a surgeon of the brain had explained to us that he could make the right hand or the left hand of a patient jerk up in the air by merely touching the particular cells in the brain which connect with the arms. "I have no doubt he can," replied the scientist; "but can he, by touching those cells, make the hand do this?"—and he lifted a book from the arm of his chair and placed it on a table at his side.

From this remark you will see at once that into all rational movement something enters which determines its nature or character. A tree moves when the wind blows, and so does a sailing ship; but the sailing ship moves to a destination because a sailor is controlling its movement. A scarecrow moves if you give it a push.

But think of the difference between the movement of the scarecrow and the movement of Handel's fingers over the keys of an organ, the movement of Van Dyck's brush over a canvas, the movement of Shakespeare's pen over a sheet of paper.

We are now taught by science that everything is in motion. Look up from this page at the door of your room. It appears to be perfectly still. Once it moved and throbbed in the forest; but it was cut

down, sawn into a plank, ceased to be a living thing, became dead wood. So, at any rate, thought our ancestors. Now we know that every piece of wood in a house is composed of atoms, and that every atom is like a miniature firmament, a tiny stellar universe, its circle blazing with specks of electricity for ever in motion.

The Earth appears to be still; but we know that it is making a vast journey round the sun, spinning at the same time like a top, and moving also with the whole universe through the voids of space. Nothing is still. You wake up and look from your window, and everything is the same as last night; a leaf may have fallen, or a window in the opposite house may have been closed, but otherwise everything is exactly where it was last night. But in truth everything you see has accomplished a journey which no aeroplane or express train could have accomplished in that time; yes, and not only trees, hills, and buildings, but the very air you breathe has also flown like the wind—the climate of your country has swept with you like an eagle through the fields of space.

LET US TRY TO UNDERSTAND THE MYSTERY OF THIS THING

What is it, this thing we call Movement? Can we shut our eyes, fold our hands, and think it out? A thing is here; then over there. A thing was red with autumn glory, now it is black as death. A thing was so small that it could lie easily in the palm of an infant's hand; now it is an oak tree with great rooks swinging in its branches. A thing was beautiful and delicious; now it is withered, hideous, ill-smelling. Look in this nest: a little white egg no bigger than a finger-nail and as still as a stone on the road—but soon a thing that flies up into the air, that sings, that builds a nest, that can feel joy, that can suffer pain.

How is it possible for us to understand the meaning of this mysterious thing?

We can begin quite simply. You want to read a book or to play a game of cricket. You take a book from the shelf or a bat from the cupboard. You have moved those things. Why have you moved them? Because you wanted to read or to play. The want came first. Your hands obeyed your will. Then we may begin by saying that movement is the action of the will. Our hands move because we will them to move. But there are many movements, even in our own bodies, which we do not consciously will. You do not will to breathe, to digest your food, to grow taller and stronger. Obviously there are many movements into which the will does not enter. And look at the movement of the tides, of the wind, of the electrons in an atom, of the stars. What are we to say of such movements?

BACK IN TIME AS FAR AS IMAGINATION WILL TAKE US

We must go back in time as far as imagination will take us. Once there was nothing but ether—or some substance out of which everything has been made—no suns, no moons, no planets, no life, no movement. All was silence and stillness and darkness. Then came movement. The ether was swept up into flaming forms. The universe became alive. There were suns and moons and planets. Light shone in the darkness. Order came out of chaos.

Now we must make the choice of everyone: Did this first movement originate in a Will, or did it happen no one knows how? Did Will come out of that movement, or did Will ordain the movement? Did Mind come first, or Matter?

Notice that there is a difference between the movement of a scarecrow and the movement of Shakespeare's hand writing Hamlet. Out of the one movement comes nothing; out of the other an ordered work of the brain. Is the universe nothing? Is it nothing more than the movement of a scarecrow blown by the wind, or is it more wonderful, more full of order and perfection, than the play of Hamlet?

A MIGHTY WILL MOVING TO SOME STUPENDOUS PURPOSE

The great majority of thinking men have decided that behind the first movement of matter was a Will, and that we could not ourselves possess wills if there had not been a previous Will.

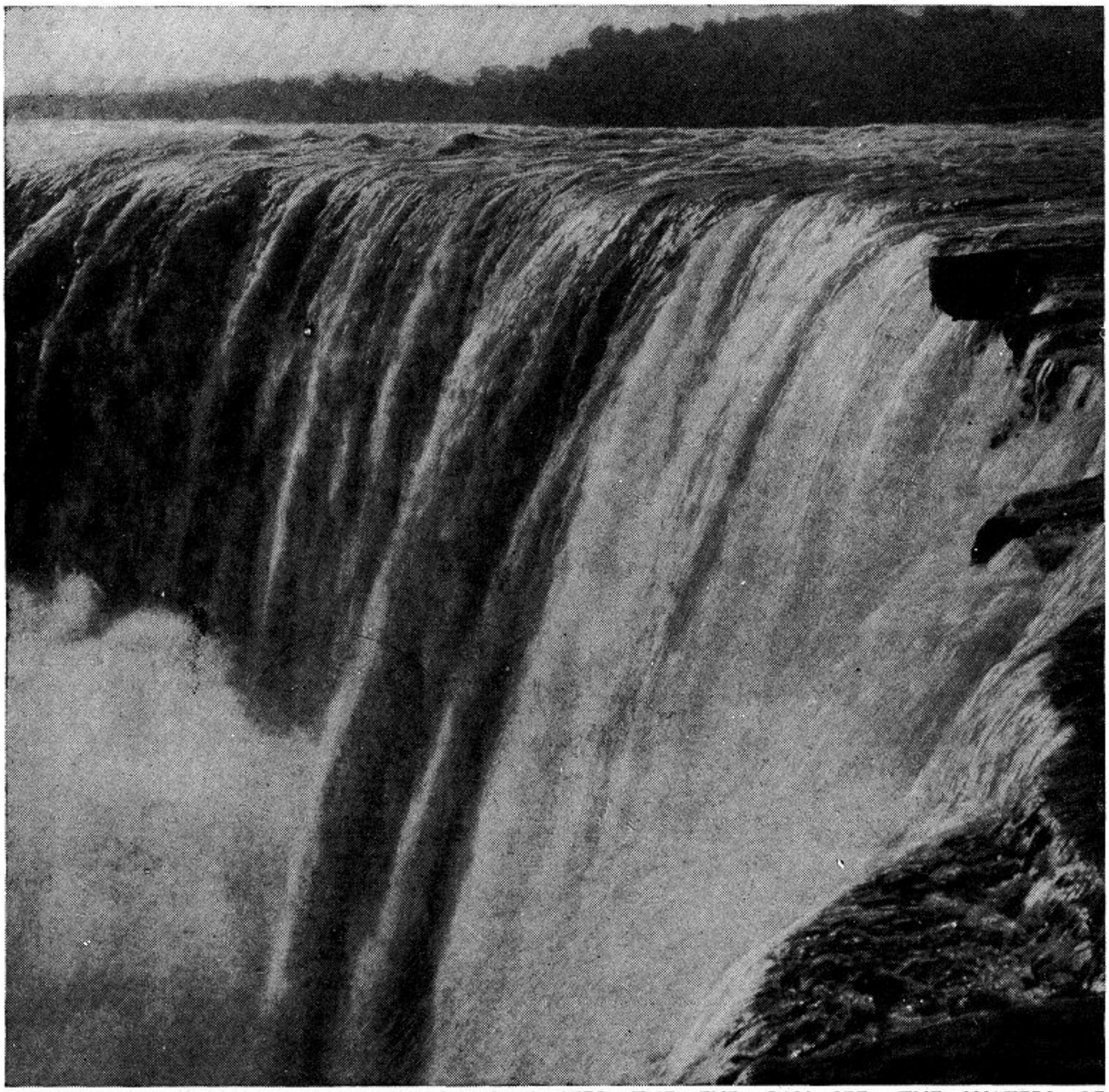
Those who take this view see in evolution the movement of a mighty Will working in matter to achieve some stupendous purpose of which we can only dream. They tell us that before there could be any potentiality there must have been a directing Activity—that is to say, before there could be an acorn capable of changing into an oak there must have been a Power to give it that capacity to turn into something so different from itself. In the beginning was God, and from God came Movement.

And see the glory of this word. Out of the first movement everything we know

has come to pass. For this first movement was not a case of moving matter from one position to another, but a case of giving it one single impulse capable of creative results, capable of going forward itself, and incapable of stopping. Matter was moved in a direction which not only brought suns and planets into existence, but suns to shine so long as God wills, and planets to bring forth life capable of everlasting multiplication. Creation is not the work of successive movements, but of one movement which is continuous and creative. We may say that the electrons blazing like fireflies in every atom represent the continuing vibration of the first movement of God's Will—the whole universe still tingling with that first touch of the Creator. Once men spoke about Evolution; now they speak of Creative Evolution. It is not the movement which amazes them, but the character of the movement. The universe is not a pebble rolling down a hill, but an arrow shot at a mark in the vast distances of Eternity.

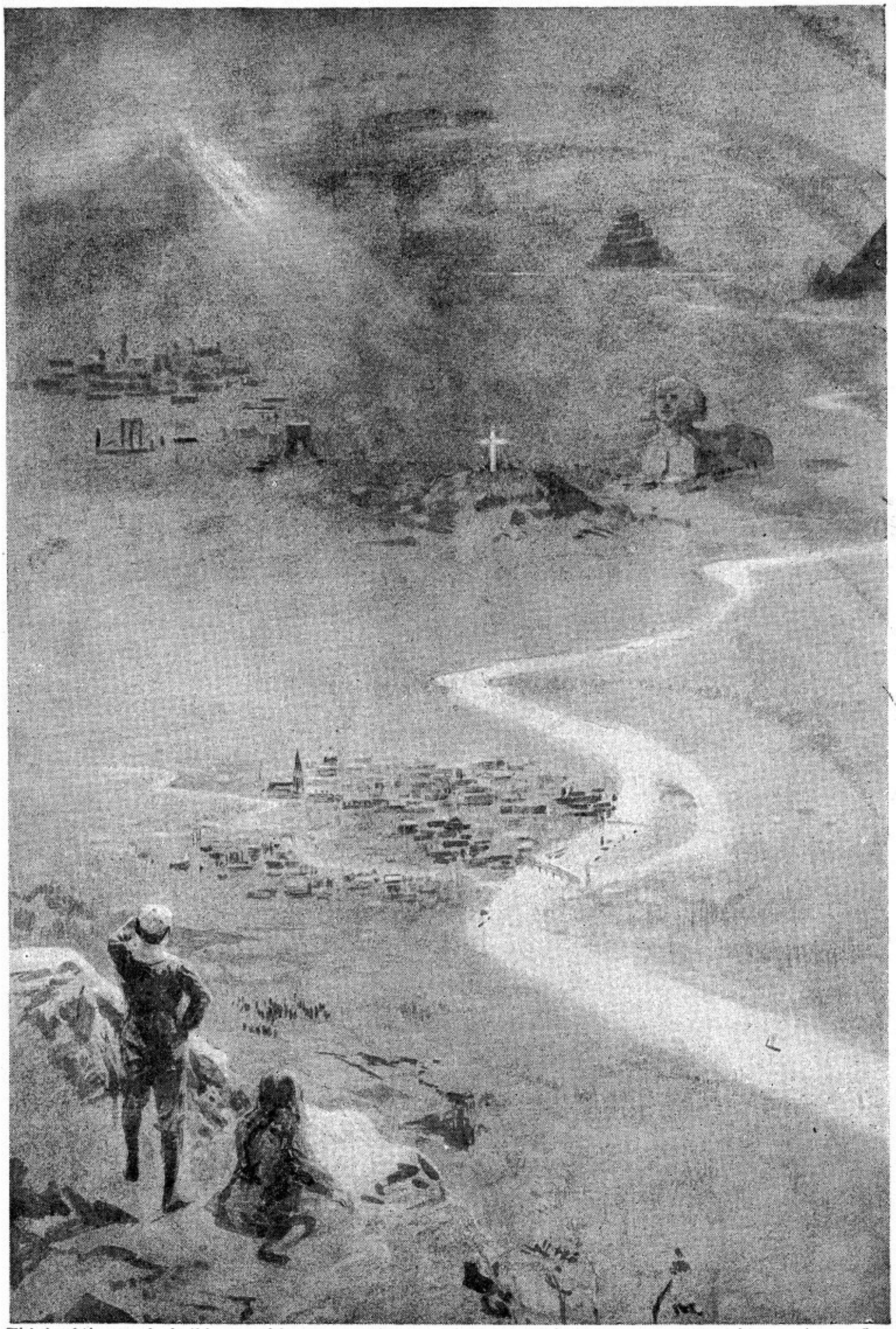
To think about movement, to realise that every metal and plank, every stone and every leaf, every nodule of soil and every drop of water, is in constant and unceasing motion is to make us wonder at the little human word *stillness*, and to prize the calm and silence of the mind in which we come into communion with the First Mover of all forms and all existences, the First Will of Creative Evolution.

There is only one stillness in the midst of a universe which is never still. It is in the soul of man.



THE MOST ASTOUNDING MOVEMENT OF MATTER THE EYE CAN SEE—THE WATERS OF NIAGARA FALLING OVER A CLIFF

THE CROSS STANDS IN THE MIDST OF TIME



Think of time and of all human history as a picture—the picture of a vast country stretching under the Sun and the Moon and the stars for ever and ever; and in the midst of this picture, lonely and sad, you will see a Cross rising out of the ground, with the figure of a Man hanging on it, dying for love of His friends and enemies. Behind that lonely Cross all the country is called B.C.—in front of it all the country is called A.D.

THE BIBLE

The Story of the Most Beautiful Book in All the World

What This Story Tel's Us

THE glory of our written language is our English Bible; of all the millions of books in the world it is the most beautiful. It is the only book read in every land by scholars and peasants and little children ; it is printed in every known tongue ; it is read by white people and black people and yellow people and red people and brown people everywhere. It has an ancient history. It comes down to us through thousands of years, filled with the wonder of the past, with marvellous and beautiful stories, and with wisdom beyond compare. Here we shall read the wonderful stories the Bible tells, the lives of the great figures of the Old Testament, the Psalms of David and the Proverbs of Solomon ; and shall go through the beautiful life of Jesus, reading the words of wisdom that fell from His lips, and considering also the work of the Apostles.

THE WAY OUR BIBLE CAME

WHEN you look at inscriptions on monuments and buildings you find that the date is very often followed by two capital letters. These letters are either B.C. or A.D. The first means the time Before Christ ; the second means *Anno Domini*, the time After Christ.

Think of time and of all human history as a picture—the picture of a vast country stretching under the sun and the moon and the stars for ever and ever ; and then, in the midst of this picture, very lonely and sad, you will see a Cross rising out of the ground, with the figure of a Man hanging upon it, dying for love of His friends and enemies. Behind that lonely Cross all the country is called B.C.—in front of it all the country is called A.D.

Jesus is the centre of history and time. From the Cross men look forward ; from the Cross men look backward. Man, you see, has divided time into two great parts, two immense divisions. The first division is the time before Jesus lived among men ; the second is the time after Jesus appeared on Earth. All over the world time is now divided in this way.

Now, the Bible, the most beautiful of all the books in the world, is divided into two parts, just as time is divided. It has its period called B.C. and its period called A. D. The period called B.C. is known as the Old Testament, and the period called A.D. is known as the New Testament. The word Testament used to be called Covenant, and this word covenant is really a much better word than testament, because it is truer to the meaning. By the Old Covenant men meant a promise made by God to man before Jesus appeared on the Earth ; and by the New Covenant men meant a new promise made by God to man in the life and teaching of Jesus Christ. The New Covenant is really the keeping of the promise made by God to man in the Old Covenant.

Now we see what the Bible is. It is a book about God and man, and the hero of the book is the great central figure in the history of the human race, Jesus.

The Old Testament is the history of a certain nation called the Hebrews, or Jews, or Israelites—three names all meaning the same thing. It is their own history written by themselves. The Jews believed they were chosen by God to teach the other nations about life and the mystery of death, and that God promised

that they should be a blessing to all the world. What God promised they wrote down, and kept the writings carefully.

They were a wonderful nation, worshipping One God when other nations worshipped sticks and stones. Then they were a poetic and kind-hearted people. They loved to live with their flocks and enjoy the simple blessings of the beautiful Earth. They made the home the great thought of their lives. What we call family life, meaning the pleasures and affections of a happy home, was the chief ideal of this brave people. What made them so happy and strong was their belief that God was watching over them. So in the midst of their sorrows they began to watch for the coming of some mighty being whom they called Messiah, thinking that this Son of God would destroy their enemies, give them back their flocks and herds, and set them up as the rulers of the whole Earth. All this is written in the Old Testament.

THE WAITING AND WATCHING FOR THE COMING OF THE MESSIAH

They watched and waited for the coming of the Messiah. The promise of the Messiah runs through the Old Testament like a little silver brook winding through a dry country toward the sea. But when the Messiah came they found that He was not a mighty warrior, but a beautiful young peasant, who sat in a weather-beaten ship with simple fishermen, and taught people that to forgive their enemies was better than to fight them. And then the Jews were angry, and refused to believe that He was the Messiah. The Old Testament shows them seeking the Messiah ; the New Testament shows them rejecting the Messiah.

In very ancient times men used to write the stories of their fathers on a peculiar paper made from the pith of an Egyptian plant called papyrus. It was on this papyrus that the Jews wrote their history, and the precious writings were kept as sacred records. Even before Christ came into the world, the Greek people were anxious to learn about the Jews and their clever writing. Men took the history of the Jews told on the papyrus and wrote it down in the language which the Greek people knew.

Now, the Greek word for papyrus was *biblos*, and this word came to stand for book ; so that they spoke of the Hebrew writings as *Biblia*, or the Books. The Latin nation borrowed this word, and our first copies of the Bible were in the Latin language and were called *Biblia Sacra*, meaning the Holy Books. At last Englishmen made their own words, and, speaking of all these writings as the Book, and not the Books, called it the Holy Bible. So that *Bible* means *The Book*.

THE BOOK WRITTEN IN FAR-OFF TIMES BY MANY MEN

We must not think of the Bible as a single book written by one man. It is many books, written at far distant times, by many very different men. These different books have been collected and bound together, because they teach us so clearly about God and man.

To understand the story of the English Bible we must go back five hundred years or more in our history. In those days the influence of the Church was not so strong as in the earliest years. England was filled with Italian clergy who failed to understand the needs of the people, and who were not acquainted with their language ; and it was at this time that John Wycliffe arose. He was a Yorkshireman, a weak-looking man with a little body but a fervent soul. He was a scholar, and he held that all men should study the Bible for themselves, and interpret it as they thought fit.

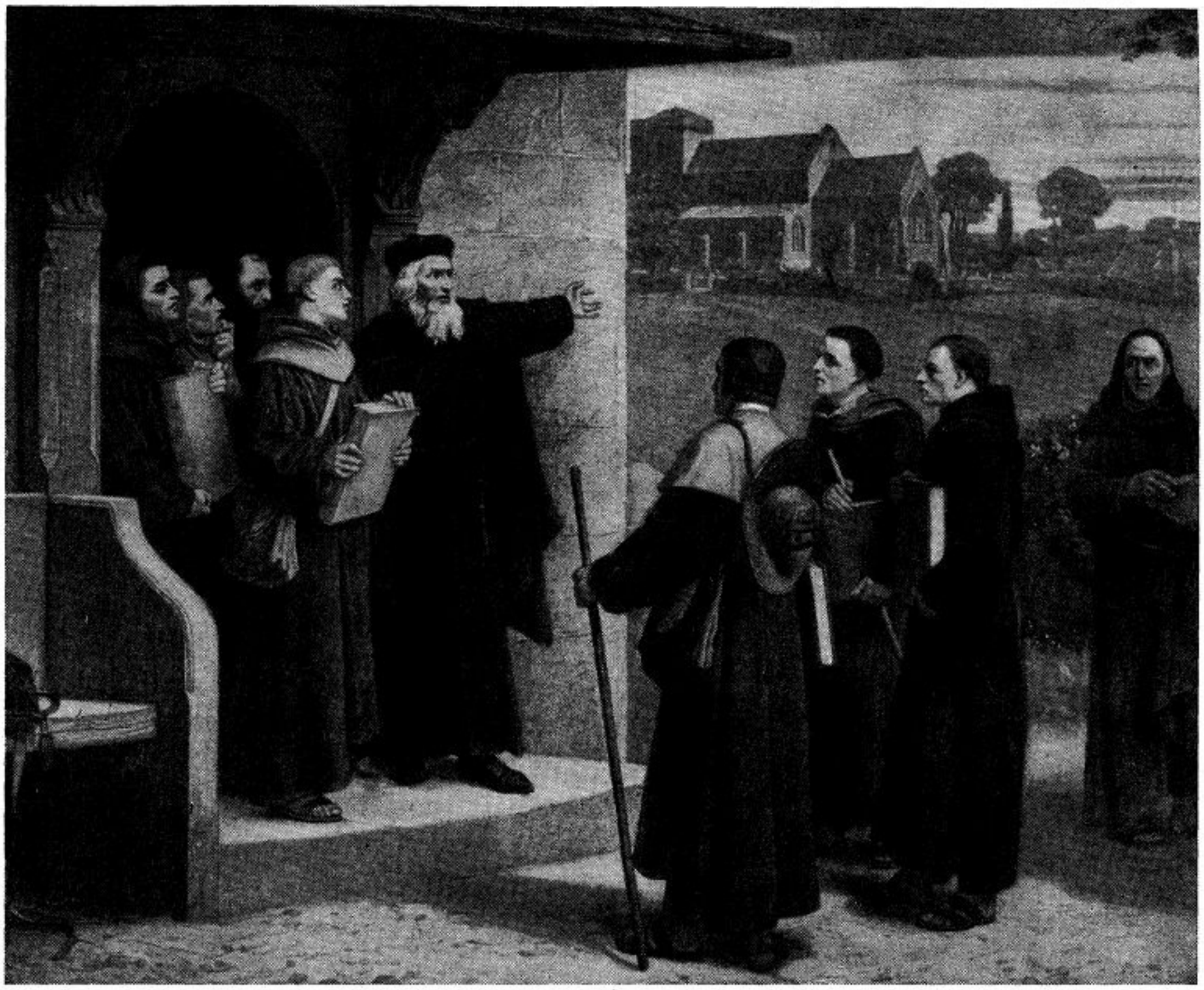
Accordingly he sent out poor men, dressed in rough serge, through the country lanes who preached the story of Jesus in plain and homely English, and this attracted many people to his views. When he himself spoke, crowds of people flocked round to listen—peasants, nobles, and townsmen.

THE GOOD MAN WHO BELIEVED THAT TRUTH WOULD CONQUER

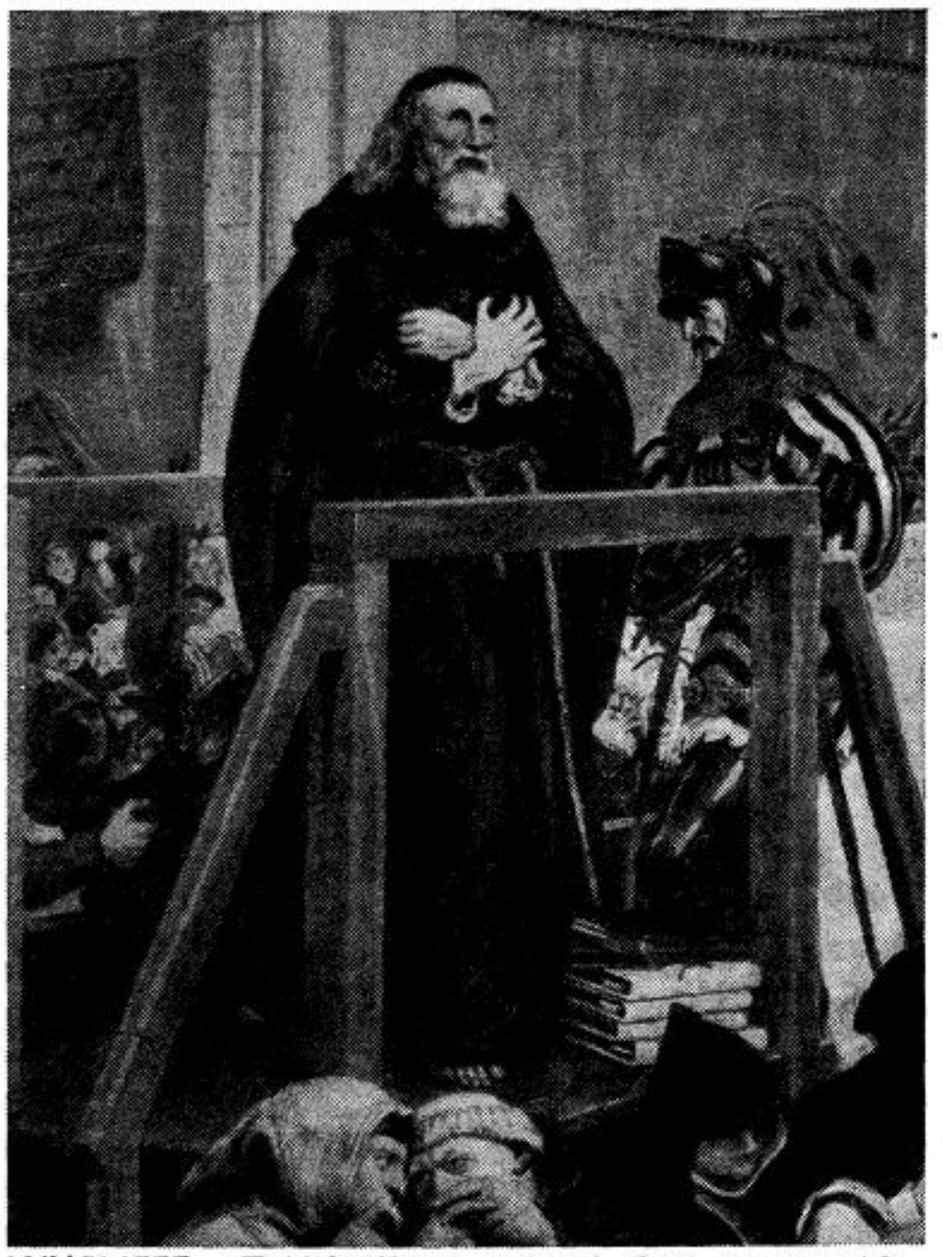
Wycliffe was not a Protestant, as the religious reformers came to be known a hundred years later, but he was the first man in England who, within the Catholic Church, claimed that every man should have a right and an opportunity to read the Bible for himself, and build up his beliefs on what he had read. Wycliffe's good work came to an end when he died at Lutterworth, in the firm conviction that he had discovered the true faith.

" I believe," said he, " that in the end the truth will conquer." Even thirty years after that the bones of this good man were dug up from the kindly earth and thrown into a river.

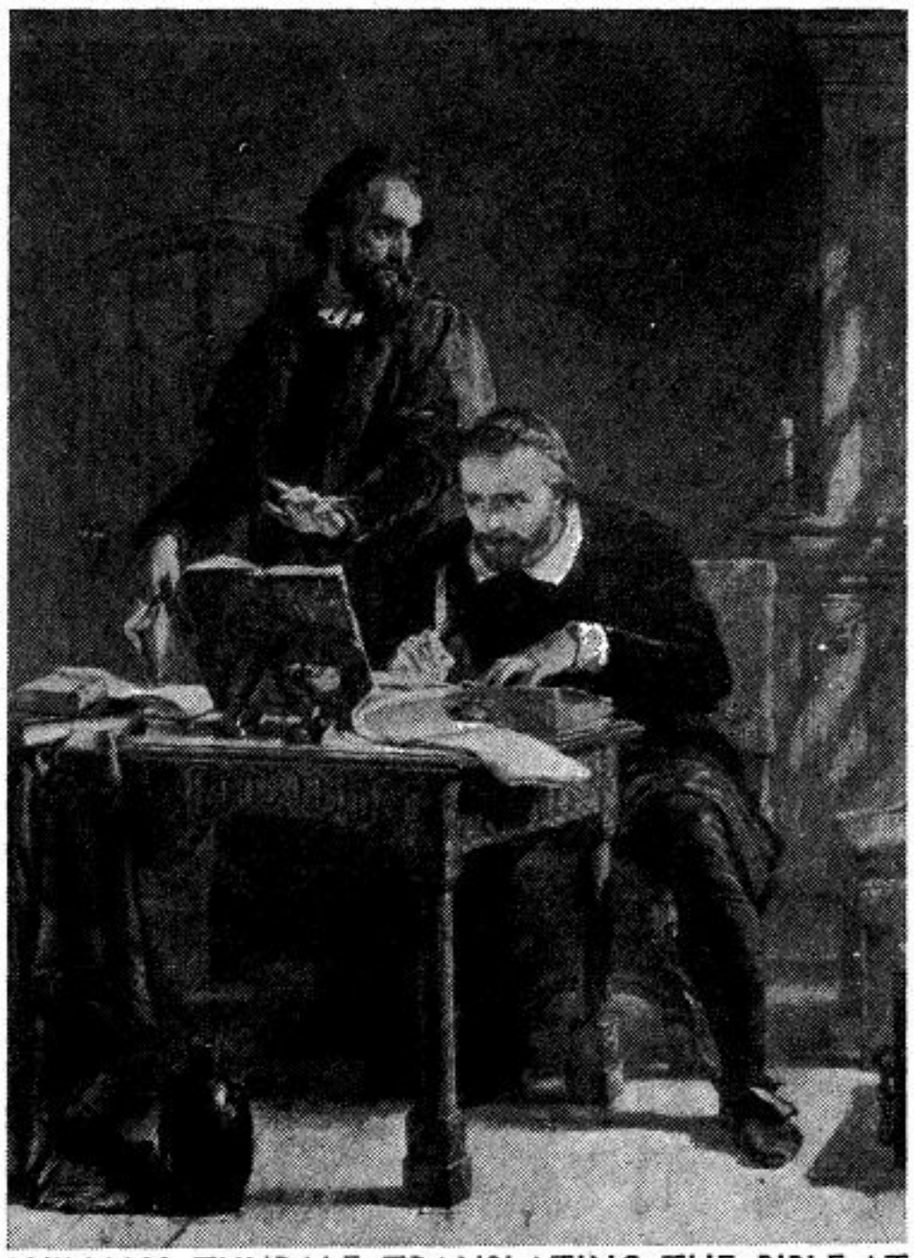
JOHN WYCLIFFE AND WILLIAM TYNDALE



JOHN WYCLIFFE SENDS HIS PREACHERS OUT INTO THE WORLD—FROM THE PAINTING BY W. F. YEAMES



WYCLIFFE AT HIS TRIAL—FROM THE PAINTING BY FORD MADOX BROWN



WILLIAM TYNDALE TRANSLATING THE BIBLE AT THE CITY MERCHANT'S HOUSE

About a hundred years after Wycliffe's death, William Tyndale, who had studied the writings of Wycliffe, determined to break away from the Roman Catholic Church, got together a company of scholars, went with them quietly to Hamburg, and set about translating the Latin Bible into our English tongue.

HOW TYNDALE BROUGHT HIS BIBLE TO ENGLAND AT GREAT PERIL

In his love for the Bible, Tyndale faced "poverty, exile, bitter absence from friends, hunger and thirst and cold, great dangers, and other hard and sharp fightings." He set up a printing machine, knowing perfectly well that he was engaging in a most hazardous enterprise. He then decided to bring over his Bible to England, a somewhat difficult task, for he had refused to obtain the authority of the Pope to make his translation, thinking he was the better judge of how the Bible should be rendered into English. But at last Tyndale managed to smuggle his Bibles into England, and when they reached this country they were secretly sent to nobles and merchants.

The news of their arrival leaked out, and every effort was made to find the Bibles. When the Church authorities got hold of them a great fire was lighted in St. Paul's Churchyard, and the books were burned. The friends of Tyndale were driven out of London, many of them going across the sea.

THE INFLUENCE OF A MAN WHOSE WORK CANNOT BE DESTROYED

Tyndale was now in great danger; he had continually to change his place of residence, and was driven from town to town. But wherever he went he continued writing the Bible in English. He lived for some time in Antwerp, but he was arrested, thrown into prison near Brussels, and first strangled and then burned. But though the body of Tyndale was destroyed, no one could destroy his work, and so great was his influence that the Reformation may be said to date from this period. The Bibles translated by Tyndale were now carried into the churches and chained with heavy steel so that no one should take them away, and the people crowded in to hear them read aloud from morning till night.

Bibles can now be bought and read freely anywhere, but things were very different then, when liberty of conscience was unknown, and when good people thought it their duty to persecute those who differed from them in religion. In those far-away times readers of the English Bible were often grievously treated, a persecution which had, as persecution always has, the very opposite effect to that which was expected.

Soon the whole country read scarcely any other book than the Bible, and talked of nothing save the wonderful book which Tyndale had introduced to the people. When Bishop Bonner set up the first six Bibles in St. Paul's Cathedral, says a writer, crowds of people flocked to hear them read aloud. "One, John Porter," a book tells us, "used sometimes to be occupied in that godly exercise. This Porter was a fresh young man, and of a big stature, and great multitudes would resort thither to hear him because he could read well." Is it not good to think of this fine fellow, John Porter, giving out the sweet music of the Bible to the common people of the land?

THE SWEETEST MUSIC EVER HEARD ON ENGLISH SOIL

Think what it must have been for England to hear the Bible read for the first time! It was the strangest and sweetest music ever heard on English soil. Try to picture the crowds of London people round those six great English Bibles chained to the lecterns in St. Paul's Cathedral. Try to picture the fair face of this big young man, John Porter. Try to imagine that you can hear his strong voice rolling down the mighty aisles. And then go back in your memory to the far-off days of Wycliffe, the days of Tyndale, writing in exile the first English Bible in Germany, and smuggling over those precious sheets to our island home. A thrill indeed it gives us to think of the suffering of those men of long ago and of our freedom now, to think how greatly and how bravely men and women have endured that we might read in our own tongue the story of Jesus, the Light of the World.

The Bible is the Book of God,
  And unto every age it shows
The ancient path that Israel trod,
  The grave from whence our Saviour rose.

Two Covenants are found therein,
  The Old and New, and both declare
How love alone can conquer sin,
  And God alone can answer prayer.

We know not who inscribed each page,
  But this we know, where'er we look,
That men have found in every age
  The God of comfort in this Book.